CHEMICAL MARKETS

THE BUSINESS MAGAZINE OF CHEMICAL INDUSTRIES

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Contents for April, 1933

CHEMICAL MARKETS *is indexed regularly in the* INDUSTRIAL ARTS INDEX

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CHEMICAL MARKETS is published monthly by Chemical Markets, Inc. WILLIAMS HAYNES, *President;* H. H. ADAMS, *Vice-President;* WILLIAM F. GEORGE, *Secretary-Treasurer.*

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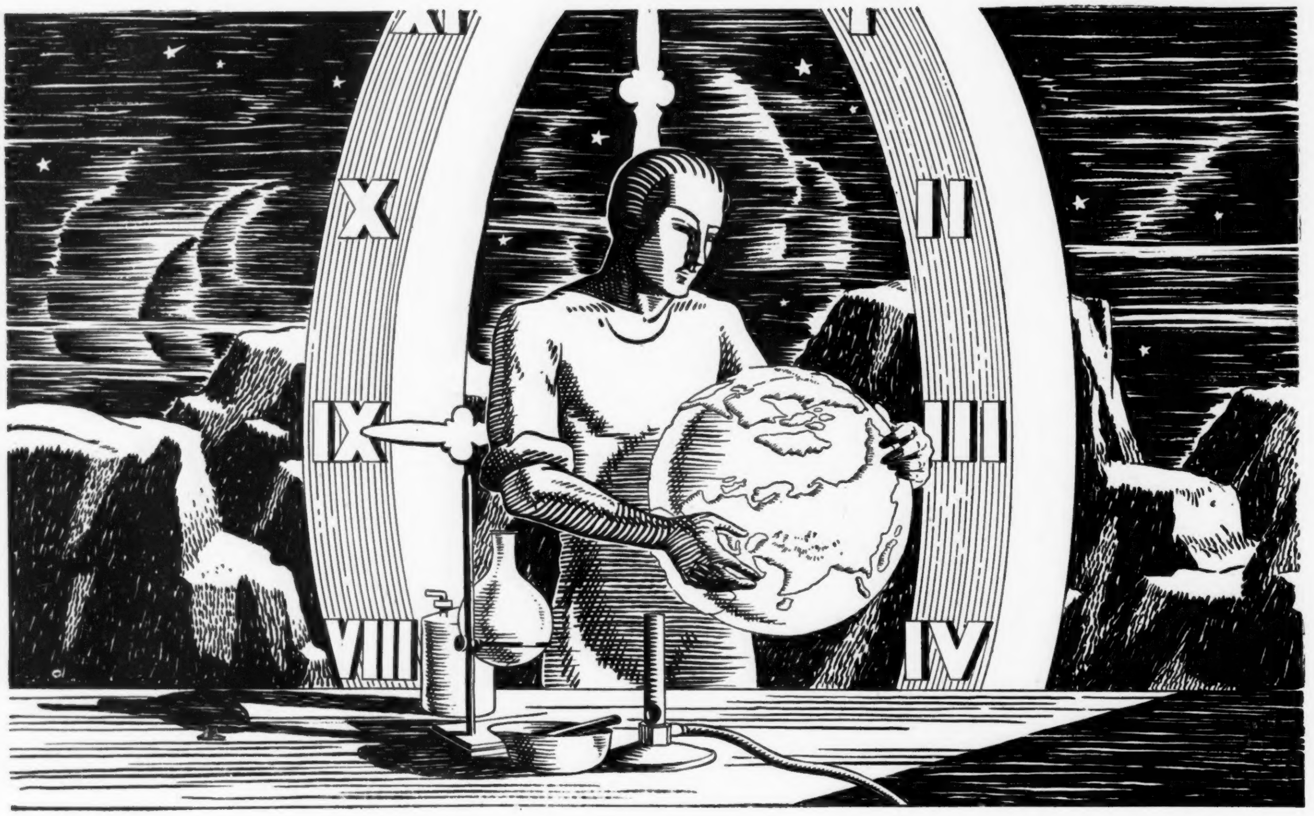
Chemical Bootlegging

As COMMONLY happens in times of stress the less-carload market is showing signs of strain, and again the problems of local distribution become acute. The appearance of numerous new re-sellers of heavy chemicals is a prominent symptom of distress. Some are consumers who are trying desperately to pick up a few pennies peddling in small quantities their surplus chemicals bought on contract at carload prices. Others are invaders of the jobbing field who get their supplies sometimes from makers eagerly seeking every possible outlet, and sometimes from established distributors who are willing to split their profits in the hope of getting a new bit of business. The result is chaotic and costly. Recent surveys disclosed fifty-seven jobbers of heavy chemicals in Philadelphia and more than seventy in the Metropolitan area. Some smaller centers are as bad, and all over the country the situation is fast becoming critical for the legitimate local distributor who has been serving his territory with warehouse stocks and delivery service.

If the established distributor attempts to maintain a living schedule of prices, he finds himself in a precarious position. He sells most of his customers an assorted line of chemicals, and when his prices on caustic and T. S. P.---to mention but a couple of the favorite items of the chemical bootleggers---appear to be out of line, the buyer's confidence is weakened. Thus the price cutter is able to jeopardize the whole l/c/l market.

Although he has most at stake, the local distributor is almost powerless either to defend his business or correct the evils. If he meets cut prices or splits prices with some chemical bootlegger, he only slashes the slender profits he needs to remain in business, and at the same time he still further demoralizes the market.

It is plainly a situation which can only be controlled by shutting off supplies from these unorthodox chemical re-sellers. The manufacturers alone can effectively do this, and although their concern in the less-carload market is not so direct, and despite the very great temptation to snaggle a little tonnage through these bootleggers, nevertheless, they should promptly act to maintain the price of bags, barrels, and drums for their effect on the price of tanks and cars, and to protect the legitimate local distributor in order to preserve their own established trade.



RESEARCH MARCHES ON

WITHOUT research there can be no progress. Imagine a world without electric lights or power. Without transportation—steamships, railroads, automobiles, aeroplanes. Without the conveniences and comforts of a modern home and without the factories that make those conveniences and comforts. Yet, that was the world a hundred years ago.

Research marches on. The Swann Corporation recognizes the importance of continually seeking the better way—better materials, improved methods and reduced costs.

Manufacturers in all lines must look toward product improvement to increase the desirability of their commodities. Perhaps Swann Chemicals can increase the purity, uniformity and desirability of your products. Call or write our nearest office.

PARTIAL LIST OF SWANN PRODUCTS

In the twelve years that Swann Acid has been available, the standards of whole industries have been raised, new products have been created, old products have been bettered—because better acid and phosphates made this progress possible.

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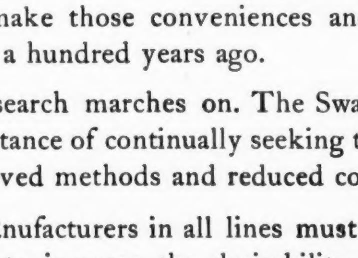
Phosphoric Acid 50%
Mono Sodium Phosphate
Di Sodium Phosphate
Tri Sodium Phosphate
Sodium Acid Pyrophosphate
Mono Ammonium Phosphate
Di Ammonium Phosphate
Mono Calcium Phosphate (H T Phosphate)
Di Calcium Phosphate
Tri Calcium Phosphate



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Division of THE SWANN CORPORATION

District Offices: CHARLOTTE, DALLAS, CINCINNATI, SAINT LOUIS, NEW YORK, PITTSBURGH

Money and Markets We have gone off gold and initiated inflation. These plain facts have been obscured by the rapid march of events, but behind this sensational parade a new economic and financial background for business has been created.

Our departure from gold is parallel to the British action—essentially a gold conservation movement—and likely our experience will be similar in that we shall be reluctant to return to a gold basis although our immediate advantages in world trade will hardly be as great as have accrued to England. The fact that we have a balance of foreign trade in our favor will make it easier to work out a technique of handling foreign exchange; but this is still a serious and unsolved problem. Its effects upon our chemical operations are secondary, due to the very small proportion of our chemical output which is exported; but its influence will surely be felt when the tariff comes up for consideration.

On the other hand, the repercussions of inflation upon chemical prices will quickly be felt. It is therefore extremely important for chemical executives to reckon very carefully with the probable degree of inflation.

In essence the new law enables the banks to pledge their good, but frozen, assets at the Federal Reserve Banks for the new currency. Thus the Reserve Banks are doing what the Reconstruction Finance Corporation has been doing with this very notable difference: the new currency is being paid out instead of credit borrowed by the Government, which had borrowed from the people.

Plainly, the germ of drastic inflation lies in this method. Over wide areas public sentiment is inflationary. Debtors vastly outnumber creditors. Congress accurately appraises this sentiment and is overwhelmingly inflationist with a number of important leaders in both parties ready to go to drastic extremes. The increase in chemical orders since March fifteenth is but a direct confirmation to our industry of the belief on the part of business that prices are bound to advance. It is important to guess correctly what that advance will be. Some say five per cent.; others, 35 per cent. Currency inflation is estimated to have been about eight per cent. to the first of the month, and with the optimistic sentiment this may easily boost the price level twenty points.

Wild inflation will meet determined opposition from the President and the Treasury, from banking interests, the insurance companies, and the more conservative industrialists. It will also be checked by the liberal policy of Federal relief work which will require heavy Government borrowing and so strain Government credit again even if the present budget is balanced. Moreover, large sums that might be poured into speculative channels are frozen in closed banks. Furthermore, such warning signals as the clamping down of insurance company loans to policy holders; the mortgage, railway, and farm situations; indications of disharmony in Washington; and the extreme uncertainties in many aspects of the foreign situation, are now visible to discriminating, forward-looking executives in many fields.

Beer Business The hysteria "brewed" by the return of legal beer leads to some fantastic estimates of the degree of stimulation that will be injected into a sorely dejected business situation. A goodly number of such opinions seem to have been stimulated by copious drafts of the "needled" variety, but few sober persons cherish the foolish belief that 3.2 per cent. beer will float the ark of business out of the swamp.

To some industries beer promises more than to others. If bars are permitted, then the former manufacturer of fixtures will be talking of "bonanza" days. The soft-drink manufacturer is likely to report that business is bad! How much will the chemical business benefit and who will be the principal beneficiaries? Perhaps the largest item in the brewer's chemical bill is for caustic soda or other alkali cleansers. Your guess is as good as the next, but we have heard 500 cars a year as a possible figure. Figuring 40 tons to a car, we have 20,000 tons a year. Refrigeration will require ammonia and calcium chloride or salt, but initial charges last a long time with but small additions. One chemical company in Brooklyn, however, is just full of joy. Before 1919 its main products were brewer's pitch and disinfectants designed for the beer trade. Another in Newark specializes in caramel coloring. There are a number of such companies scattered throughout the country. In the first year the tremendous demand for bottles will increase soda ash consumption at glass plants. Suppose the time-honored wooden case is rejected for the corrugated box. Here is a possible increase for the silicate producers. To the equipment manufacturers and the cooperage trade the return of beer will result in real worthwhile increases. One refrigerating machinery company reports orders for $100,000 and inquiries totaling $1,155,000. But, on the other hand, such im-

provement may mean higher prices to the chemical industry when it enters the market for equipment and wooden containers.

Somehow or another we just cannot wax enthusiastic about the new business beer will bring to chemical manufacturers. Would you trade it for another rayon or lacquer industry? Yet, it will, we believe, stimulate general business, help unemployment, and so aid in a return to more normal conditions. Prosit!

Higher Prices Startling as it may seem chemical famine is in prospect. Benzol supplies are scarce and producers were able to increase their quotations two cents a gallon during the past month. Several factors have contributed to this condition. For several months now quiet but sustained purchasing for export has taken large amounts out of the domestic market. It is reported that the Japanese have been large purchasers. The continued low operations in the steel and coking industries over a period of two or three years have left no accumulation of benzol stocks. We know definitely of at least one large export inquiry (30,000 gallons) that could not be filled. The outlook is for firm and possibly higher prices for benzol. What has been said of benzol is largely true of phenol. It is rumored that one large phenol producer is completely sold up until late summer.

"Hooey" a la Rainey What a fine spectacle the Hon. Henry T. Rainey spread before the drug and chemical industries at the Board of Trade dinner. His thirty years of public service in the House of Representatives have molded him into the *beau ideal* of the politician, a sort of personification of Congress; and he played the part to perfection.

His fine voice, his dramatic pauses, his subtle flatteries, his stock of anecdotes culled carefully from many sources and turned into personal reminiscences, were all a beautifully polished demonstration of the experienced public speaker. No higher praise can be paid his oratory than the careful attention the sophisticated audience gave his flow of words. When he spoke of passing the banking and the economy laws in three days as the greatest legislative exploit of all time, he almost made his hearers forget that Congress has for two years shied away from these problems and has solved them today only by putting them up to the Executive. When he boasted Congress would abolish the economic laws of Adam Smith and John Stewart Mill, one hardly had time to wonder what he has learned during the past three decades about supply and demand and the workaday business of the country. To hear his eulogy of the benefits of beer in lightened taxes and new employment, would anyone suspect that he had ever voted "dry"? In one breath he promised no more irritating and oppressive taxes; in the next he declared that the Government is going to pay the farmer a profit on all the wheat, corn, and cotton the country raises.

It is doubtless well that Huey Long was unable to speak, for he would have outraged the sensibilities of many. It was doubtless safer that hooey a la Rainey should insult the intelligence of all—safer, and apparently almost as popular.

Quotation Marks

We shall find in the next few years the value of the scientific training we have been giving the youth of America. The exploration of new fields not only for wealth creation, but for improvement of humanity's welfare will be demonstrated. Through the chemist and the engineer we will enter upon a new era of tremendous opportunity.—*Manufacturers' Record.*

If the trend of manufacturing during the last five months of 1932 represented the beginning of a definite recovery, as now seems probable, the rate of expansion during this period may be used as a basis in calculating the future trend. The average gain per month during the latter part of 1932 amounted to 1.6 points. At this rate of recovery, the high point reached in June, 1929, would be regained in March, 1936.—*Alexander Hamilton Institute.*

Fifteen Years Ago

(From our issues of April 1918)

John H. Raskob, formerly treasurer E. I. du Pont de Nemours Powder Co. has been elected a vice-president of that concern.

The Powers-Weightman-Rosengarten Co. celebrated its century mark as a producer of medicinal chemicals.

Warring countries recognize value of castor oil as lubricant for airplanes thereby increasing importations of castor beans.

General Industries Corp. file certificate at Dover, Del. changing name to du Pont American Industries, Inc., increasing capital stock from $25,000,000 to $50,000,000.

Mineral authorities advocate this an excellent time to introduce strontia process in this country.

Shortage of acetic acid and arsenic caused by unusual consumption by Government forces Imperial Chemical Co. of Grand Rapids to curtail production of paris green, turning down orders to the amount of 1,000 pounds a day.

Olean Chemical Co., Olean, N. Y. incorporates with capital $100,000.

1,600,000,000 Gallons of Alcohol

The Chemical Economics Involved in the Proposed Alcohol-Gasoline Motor Fuel Law

By Williams Haynes

BASED on the average fuel consumption of our 25 million motor vehicles, a law requiring a 10 per cent. alcohol blend with our gasoline would create overnight a market for one and a half billion gallons of ethyl alcohol.

Considered in terms of ordinary chemical production, these are astronomical figures. Our all-time record of alcohol output stands at 106,960,000 gallons (1929) is but one-fourteenth of this proposed demand.

Since the days of the Pharoahs, who invented the excise tax on liquors some 3,000 years ago, alcohol has been the "legal liquid"; but this newest legislation far overshadows in its economic consequences even the tax-free denatured alcohol law of twenty-five years ago which shifted the alcohol industry to its present seaboard plants and molasses raw material.

Logical Farm Relief

This proposed law has strong backing. As a measure of farm relief it has much to commend it in comparison with either price fixing or acreage reduction. The political, technical, and legal aspects of this alcohol blended motor fuel are being discussed in the daily press, and it is illuminating to consider its chemical aspects.

Although alcohol may be produced quite simply from any sugar, and by means of the malting process, from any starch—as thousands of Americans have learned during the past dozen years—nevertheless there are at present three raw materials commonly used in this country. Of our last year's production of 75 million gallons, four-fifths were made from molasses; a tenth by synthesis from ethylene; a twenty-fifth from grain, chiefly corn.

To produce the one billion five hundred million gallons necessary for the suggested motor fuel blend, plus the hundred million gallons normally consumed in industry and as an anti-freeze, would require four billion gallons of molasses. At 25-30 gallons of blackstrap from a ton of crude sugar this would mean a sugar crop of 100 million tons. There are at present in all the West Indies about 300 gallons of molasses available a year for conversion into alcohol. From the present, most important raw material, we could produce only 120 million gallons of alcohol.

The synthetic process is limited in its potential output by the available supply of ethylene. From the vapor phase cracking plants there are available some 20 to 22 million feet of gas, containing on the average 20 per cent. recoverable ethylene. From 4 million feet (160 tons) of ethylene could be produced 64,000 gallons of alcohol a day, or say roughly 22 million gallons a year. Under existing conditions and present prices, it is not economical to work with gases containing less than 20 per cent. of recoverable ethylene. There are, however, numerous sources in vast quantities of this material available, but the investment in a synthetic plant is greater than in either the molasses or grain operations, and it would require alcohol at a high price and a market assured for a number of years, to tempt petroleum, chemical or gas companies into the technically complicated business of recovering ethylene and converting it to ethyl alcohol.

Alcohol Blend Merits Thorough Investigation

Obviously present operations based on molasses and ethylene, even if stepped up to the limits of their available raw materials would leave an alcohol deficit of well over a billion gallons. But the law introduced by Congressman William E. Hall, of Peoria, Illinois, is entitled, "To provide that liquid fuel used in internal combustion engines shall be blended with 10 per cent. of alcohol, made from agricultural products grown within continental United States." This means an embargo against molasses and a ban on the synthetic process.

It is interesting to check what it means in terms of the various crops suitable for conversion into alcohol expressed in farm acreage and based upon the conver-

Alcohol Production and Acreage of Principal Crops

	Total Fermentable Carbohydrates per cent.	*Yield of 95% alcohol per acre in U. S. gal.*	*American Crops in acres* 000 (omitted)*	*Acreage required for production of 1,500,000,000 gal. of alcohol 000 (omitted)*
Corn	67	72	100,018	20,833
Wheat	65	50	56,308	30,000
Barley	60	59	9,495	25,423
Rye	64	38	3,660	39,736
Oats	55	50	43,180	30,000
Sorghum grain	67	72	6,488	20,833
Rice	76	44	975	34,091
Potatoes	17.5	162	3,373	9,259
Sweet Potato	27	170	835	8,823
Sugar beet	15	350	672	4,285
Sugar cane	13	306	180	4,900

*Average of the years, 1925, 1926, 1927, 1928.

sion tables and average crop yields compiled by Monier-Williams and the official crop reports of the U. S. Department of Agriculture. The table reveals what an astonishing quantity of farm produce would be consumed in the production of 1.6 billion gallons of alcohol. It would take a third of our corn crop and four-fifths of our wheat crop. If all our beet sugar crop were turned into alcohol the output would be 185 million gallons. Potatoes are interesting as they are the common European raw material. Our total potato crop would only produce about a third of the alcohol required by the proposed law, and even if all the sweet potato crop also were converted to alcohol the combined production would be but 43 per cent. of the requirements. Of course, no single crop would ever be wholly devoted to alcohol production, but the acreage required does have a pertinent bearing upon the important question of the location of the new plants which would be required.

This important factor, and one that has more than once wrecked several well-meant agri-chemical operations, is the availability of raw materials. To suggest, as has been done, that alcohol could be produced from grains or tubers in small "chicken house" plants scattered all over the farm map, is simply begging the question again, for a modern alcohol distillery, equipped to produce anhydrous alcohol, is an enterprise that calls for a very considerable investment, and must be expertly operated. It is the concensus of good opinion in the alcohol industry that a unit that would handle less than 25,000 bushels of grain a day is uneconomical.

A daily consumption of 25,000 bushels means eight million bushels of grain a year. At 30 bushels of corn to the acre this means that an economical alcohol plant would need a supporting supply of 266 thousand acres of corn, or double this acreage of wheat. In miles this means an area 20 miles square for corn, or 40 miles square for wheat, say a haulage circle with a radius of 15 and 30 miles respectively. Even the longer distance is comfortably within the limits of the motor truck, so that there are plainly many points at which alcohol plants operating on grain and producing roughly 20 million gallons of alcohol could be advantageously located in respect to their raw material supplies. There are at present seven grain alcohol plants located in the middle western states, to say nothing of the plants in New Orleans which could be supplied with grain by barge down the Mississippi at a freight cost estimated not to exceed 9c a bushel.

Our present alcohol capacity stepped up to maximum production could produce about 300 million gallons provided the existing seaboard plants continued to operate on their accustomed supplies of molasses and the synthetic output was not checked but allowed naturally to develop. To furnish a 10 per cent. motor fuel blend therefore, would need sixty-five additional units of 20 million gallons yearly capacity.

While one may very properly question the sound economics of making such a plant investment to produce a motor fuel and while there are always plenty of valid objections to using a foodstuff as a chemical raw material, nevertheless this proposal has some real merits as a measure of farm relief, and all acknowledge that the restoration of some measure of buying power to the farm population is vital to every phase of American industry and trade.

Corn Largest Produced Crop in U. S.

In the first place, corn is not only our largest crop, but it is also our most widely grown crop. We normally plant some 100 million acres of corn against 40 of oats, 45 of cotton, 55 of wheat, and 60 of tame hay. Economically—and politically too, which is a real consideration—the Corn Belt states of Ohio, Illinois, Indiana, Missouri, and Iowa are extremely important. Moreover, the Corn Belt has been slowly moving

westward and northward, and Kansas, Nebraska, Minnesota, and South Dakota have all evidenced a more than lively interest in this fuel alcohol project. In New Jersey, Maryland, West Virginia, and Tennessee more acres are planted to corn than any other crop. Virginia and Kentucky devote more acres to corn than to tobacco; North Carolina and Alabama plant more acres of corn than of cotton; and more Florida acres grow corn than oranges and early vegetables added together. In New England too, and in the Eastern Central states, corn is an important crop, so that fuel alcohol is assured support in every politically important section except the Pacific Coast. This support is powerfully buttressed by the fact that the prices of hogs, cattle, and milk are all more or less closely correlated with the price of corn.

On the other hand, of all the great commodities of commerce—coal and iron, the other metals, chemicals, rubber, leather, even wheat and corn itself—none so immediately and intimately affects the pocketbooks of so many Americans as does gasoline. This is true not only because about half our families operate an automobile, but more especially because gasoline is merchandized upon a price basis that fluctuates quickly and widely with changes in the primary market. Furthermore, the high taxes on gasoline have caught the attention of the army of motorists. Finally, the powerful automobile and petroleum interests will not welcome anything which will even tend slightly to curtail the use of motors and of gas. The opposing claims differ radically. The advance in the price of gasoline, for example, has been forecast all the way from "one cent" to "double."

The automobile engineers have been emphasizing, doubtless with some exaggeration, that alcohol, being a capital solvent, would loosen the gummy and scaly deposits which accumulate in the gas tank and fuel line. Much more serious is the possibility of the separating of the alcohol-gasoline mixture, into its component parts unless absolute alcohol is used. In a long series of experiments carried on for many years by the U. S. Industrial Alcohol Co., with the object of opening up a market as a motor fuel for their product, the practicality of the alcohol blend up to 20 per cent. was proved by thousands of miles of road tests. It was not commercially feasible because of costs. Until recently the removal of the last five parts of water of the 95 per cent. grade to produce the absolute or anhydrous alcohol has been a delicate and costly operation. Improvements in distilling apparatus have been perfected so that water-free alcohol can be manufactured at a cost of about one cent a gallon over the 95 per cent. grade. This absolute alcohol will not separate out by the absorption of moisture from the air; nor can it be removed for bootlegging purposes by the simple addition of water without carrying over a flavor that makes it quite unpalatable.

As a measure of farm relief, the matter of costs is going to be a secondary consideration. Friends of the proposal claim that it will raise the price of corn to 60c a bushel, which would give a raw material cost with the malt of 30c a gallon. Against this is to be credited the resale of the so-called distiller's grains. Because of the high protein content of these grains, its feed value is greater than corn, and they command a premium ordinarily of about $4 a ton. It would therefore seem reasonable to credit the feed by-product at the price per pound of the corn, figuring roughly 400 pounds of feed to every 100 gallons of alcohol produced. This amounts to a credit of four cents a gallon. In such vast quantities as are proposed, overhead and marketing costs will be quite different from present experience, but there is plainly no reason to doubt the estimate that even at 60c corn the tank car price including conversion costs, plant investment, selling and delivery costs would not be higher than 45c a gallon. On this basis it might be expected that a 10 per cent. alcohol blend would add say 5c a gallon to the station price of motor fuel.

Which Is More Practical?

Two different views are held by supporters of the fuel alcohol proposal. The one would set the blend at 10 per cent. and place no restrictions on the source of the alcohol. The other would leave the present supply of industrial and anti-freeze alcohol in the hands of the present suppliers, working with their accustomed raw materials, and require a 2 per cent. blend from American grain in gasoline.

The Ten Per Centers point out that this quantity would be so great that present supplies from non-agricultural sources would be no more than fair aid to established interests which would be a constructive move, besides allowing molasses and ethylene to serve as a balance to keep grain prices soaring to points that might only tempt over-planting. They also maintain that the simplicity with which their unrestricted source of alcohol might be administered is a very great advantage and that the large quantity of a billion and a half gallons is a sufficient quantity not only to help corn, but to help also wheat, rye and barley and possibly potatoes and beets as well.

The Two Per Centers claim that this would take out of the market 120 million bushels of corn, or enough of the 350 million bushels that ordinarily get to the open market to raise the price of corn without inducing over-planting. They point out too, that to produce 300 million gallons of additional alcohol does not present the plant problems of the larger program. They emphasize that a two per cent. blend would not so seriously cut into gasoline gallonage and that it would raise the price of gas to the motorist only a wholly insignificant amount.

Hydrogenated Diluents

By A. M. Platow

PERSEVERANCE has finally successfully developed a process which literally tears apart molecules of crude oil and re-forms them at will into a series of hydrogenated high solvency naphthas, lacquer diluents, varnish thinners, rubber solvents, etc. Large scale production of these products and long commercial runs of operation without "shut down" demonstrate conclusively the ruggedness of the catalyst used and the workability of this hydrogenating process.

The first step is the production of hydrogen gas by leading natural gas (CH_4) through tubes packed with a catalyst and a marked increase of temperature, which is followed by the introduction of steam followed by a second reaction using another catalyst. The gas leaving is then composed of $H_2.CO_2.CO$ and unreacted natural gas. This mixture is then compressed and the impurities removed by scrubbing with triethanolamine ($(CH_2OHCH_2)_3N$), under pressure. At the end of the process almost 97% pure hydrogen results.

The stock oil, low aniline-point straight run or cracked light gas oil, to be hydrogenated is raised to operating pressure by steam driven pumps at which time it is mixed with the hydrogen gas. Following this, the mixture is raised to a temperature of about 700°-900°F., after which it enters the reaction chambers. Here the reaction takes place with the aid of sulfur resistant catalyst. Heat is produced by the reaction sending the temperature to 750°-1050°F. From these reaction chambers the mixture is passed through cooling coils and then into a separator where the gas and liquid products are separated under full pressure. The liquid is drawn off and stored while the gas is recompressed for mixing with new hydrogen and the cycle is repeated. The catalyst is used for one year and then removed from the chambers and restored to its original activity by chemical treatment.

Petroleum hydrogenation process besides being the source of new and specialized products, has been chiefly used to improve low-quality lubricating distillates, etc.

Much difficulty has been encountered in getting the correct diluent for lacquers and thinners for paint. Commonly there are two kinds of lacquer diluents: first, the coal-tar diluents as xylene, toluene and, second, the petroleum diluents as benzine which, if of the proper composition, is the preferable because of the following advantages, a valuable non-lifting feature, no pungent and objectionable coal-tar odor, less tendency to "bleed" when a second coat is applied because a petroleum diluent has practically no action on either lacquer, oil or synthetic resin finishes previously applied.

Industry is asking for diluents that can be added in greater quantities without affecting the properties of the lacquer as to its quality. It wants a lower dry point, so that less of the expensive true solvent can be safely used without danger of cotton blush. It must reduce the danger of moisture blush by a control between evaporation rates of the solvent and the diluent. Tests show that hydrogenated products are decidedly superior to the petroleum solvents produced by ordinary refining methods. The hydrogenated product can be fractionated into a number of cuts of desired boiling range, as the distillation and evaporation characteristics are controlled by adjustment of the feed stock boiling range.

Commercial production is under way to establish a complete line of hydrogenated solvent naphthas to find application as diluents and thinners which will fill the aforementioned demands of the industries as well as leading to the production of solvents where a combination of high solvent power and controlled evaporation rates is essential.

The following values compare the hydrogenated products with similar coal-tar and petroleum products.

Comparison of Various Diluents

(From Recent Progress in Hydrogenation of Petroleum)

Diluent Naphthas	*Hydrogenated*	*Normal Petroleum*	*Coal-tar*
Gravity° A.P.I.	31.6	51.9	33.1
Color, Saybolt	+25	+30	+22
Aniline point, ° F.	—19[b]	147	17
Sulfur %	0.06	0.03	0.06
Initial Boiling Point° F.	293	311	302
Final Boiling Point° F.	412	413	378
Kauri butanol value[a]	77	30	72

(By P. Byrne, E. Gohr and R. Haslam)

aStandard testing method in the varnish and lacquer industry, denoting the amount of solvent naphtha which can be added to a standard Kauri gum solution without coagulation. bExtrapolated value.

These can be fractionated into a number of cuts of desired boiling range as demonstrated:

Hydrogenated Diluent Naphthas

Cut:	*280-375°F*	*320-400°F*	*340-420°F*
Gravity A.P.I.	34.7	28.7	25.6
Color, Saybolt	25	27	27
Aniline point, ° F.	—22a	—50a	—27a
Corrosion (copper)	Pass	Pass	Pass
Sulfur %	0.02	0.03	0.02
Flash, ° F.	83	107	126
Kauri butanol value	74	78	80
Dimethyl sulfate value	100	100	100
Initial boiling point° F.	286	318	340
Final boiling point° F.	374	398	418

(From Recent Progress in Hydrogenation of Petroleum, by P. Byrne, E. Gohr and R. Haslam) aExtrapolated values.

A Pinch of Salt to Tons of Chemicals

By Walter J. Murphy

AMERICA'S pinch of salt is 7,000,000 tons a year. Were it not that large consumers are in many instances large producers, drawing brine from wells sunk close to, if not under their plants, approximately 185,000 freight cars would be required to transport our twelve month's supply of salt to market. Our imaginary freight train would reach from New York to Kansas City, over 1,300 miles. Despite the cheapness of salt (the average value of all salt was only $2.93 a ton in 1931) the amount sold or used was valued at $21,541,012. Next to coal, salt is the most widely distributed and abundant material in the United States.

No one needs a formal introduction to salt. Since childhood we have been on most intimate terms. Indeed, the story of salt is the story of civilization itself. "Salt of the Earth" is an expression that will live forever. Essential in the time of Moses, salt is still one of our most important raw basic commodities today. Salt has passed through three different phases in the flight of the early centuries—religious, commercial and political. In 2,000 B. C. the Chinese had a special god of salt; Levitical law in 1,500 B. C. required all sacrificial offerings of meat to be seasoned with salt; the Egyptians consigned their dead to its care; the Greeks considered it as a symbol of justice. The Thracians and others used salt as a medium of exchange; the French Revolution was in part brought about by the unjust salt taxes. Indeed an exciting book could be written on the folklore of salt. It is, however, with its present commercial and chemical significance that we are concerned.

One of our leading industrial chemists recently said "Give a chemist coal, salt, water, lime, sulfur and cellulose and he can perform nearly all the modern miracles in chemistry." Salt and sulfur are the two pillars upon which largely rests the great modern structure of industrial chemistry—salt the basis of

To over twenty-five of our major industries salt is a prime essential. From the soles of one's shoes to the hat on one's head salt is required in the manufacture of every item of clothing worn. Our industrial success as a nation to no small degree has been due to our tremendous salt resources.

Ewing Galloway

our alkaline, and sulfur the basis of our acid tools. The late Ellwood Hendrick aptly summarized the importance of salt and sulfur in his well-known "Everyman's Chemistry:"—"We said, in considering sulfuric acid, that if it were called the old horse of chemistry, we should have to regard soda as the old mare." He, of course, was referring directly to caustic soda, but indirectly to salt. Without salt and sulfur modern civilization with its refinements, conveniences, and amusements could not exist. The two are the Damon and Pythias of chemistry. As evidence of the rapidity in the industrial growth of the use of salt, it is only necessary to note that our per capita consumption in 1890 was only 34 pounds; in 1900 it was 77 pounds; in 1910, 92 pounds; in 1920, 124 pounds; and in 1930 about 134 pounds. The relatively large requirement per person, as compared with the salt amount used for culinary purposes, indicates how extensively salt is used in industry.

But before going into the uses, particularly the industrial, and still more particularly, the industrial chemical uses of salt, it is vital to a proper appreciation of the importance of the industry to consider briefly, first, the geography of the commercial deposits in the United States; second, the various methods of manufacture; and third, the various grades of salt.

Salt was first discovered in New York State. Historical documents mention salt as early as 1663. White people began its manufacture from brine in the vicinity of Syracuse in 1788, and rock salt was first discovered in 1865. Between 1888 and 1896 numerous wells were drilled for the extensive salt and chemical industry near Syracuse. Deposits in Michigan, Ohio and other states later attained very great importance.

Today (and indeed for several years past) Michigan has been the leading salt producing state, followed by New York, Ohio, Kansas, Louisiana and California in the order named. Michigan ranks first as a producer of evaporated salt, it is followed by New York, Ohio, California and Kansas. New York leads in output of rock salt, followed by Louisiana, Kansas and Michigan. Ohio, Michigan, New York and Virginia produce large quantities of brine for industrial chemical manufacturing. The following table gives by states the salt sold or used by producers for the years 1929 and 1931.*

State	1930 Short tons	1930 Value	1931 Short tons	1931 Value
California	350,370	$2,080,133	334,900	$2,000,567
Kansas	759,800	3,148,728	691,160	3,003,756
Lousiana	535,250	2,164,365	529,280	1,962,690
Michigan	2,558,290	7,884,072	2,053,980	5,760,001
New York	2,009,280	5,837,103	1,788,940	5,293,470
Ohio	1,311,440	3,015,206	1,398,000	2,526,952
Porto Rico	(1)	(1)	11,560	19,878
Texas	(1)	(1)	103,040	468,562
Utah	85,240	188,983	74,010	159,778
West Virginia	28,670	184,327	35,480	218,762
Undistributed[2]	416,100	506,563	337,720	126,596
	8,054,440	$25,009,480	7,358,070	$21,541,012

[1]Included under "Undistributed."

[2]1929 and 1930, Nevada, New Mexico, Oklahoma, Porto Rico, Texas, and Virginia; 1931, Nevada, New Mexico, Oklahoma, and Virginia.

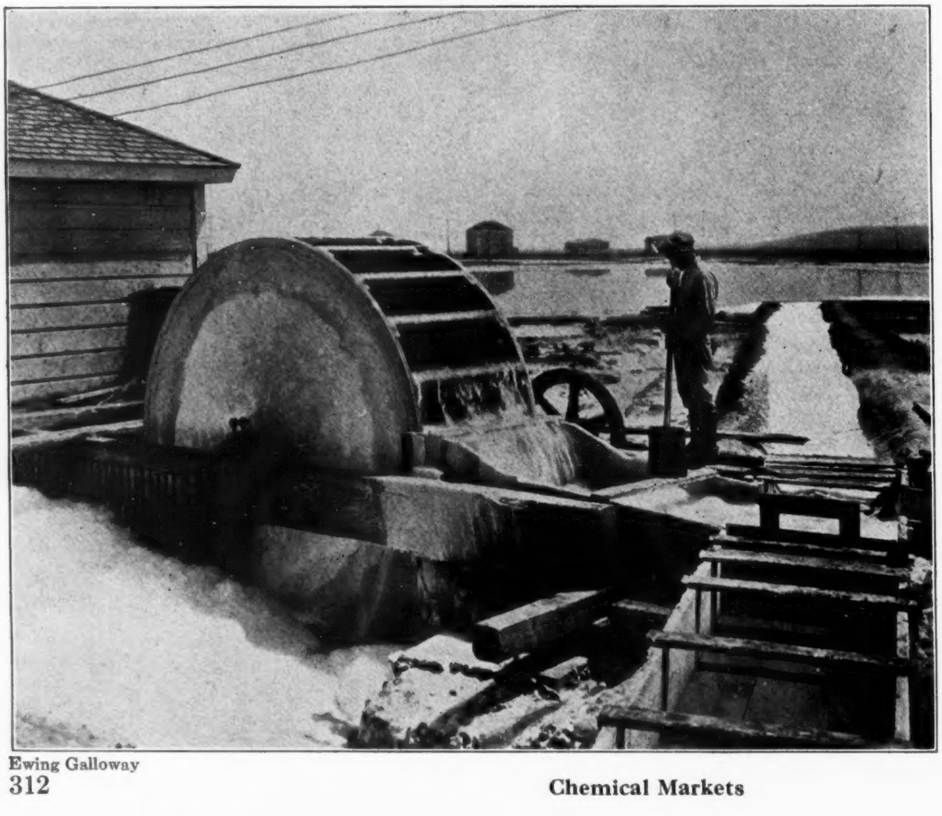
It is apparent that although salt is widely distributed, the industry commercially is centered largely in Michigan, New York and Ohio. These three states furnished 71 per cent. of the total in 1931.

Salt is produced commercially by five methods:—

1. Vacuum pan evaporation of brine.
2. "Grainer" evaporation of brine.
3. Open pan evaporation of brine.
4. Solar evaporation of brine.
5. Rock salt mining.

The first four methods are given in order of their importance at present. This is approximately the reverse of the order in which they were developed.

This table and ones appearing on pages 314 and 316 are taken from Salt, Bromine and Calcium Chloride in 1931, Bureau of Mines, by A. T. Coons.



Ewing Galloway

Most novel and interesting is the "solar" method of winning salt from the sea. In California, in the vicinity of San Francisco Bay, a large industry has grown up "harvesting" salt. Sea water is allowed to run into ponds where it is evaporated by natural heat. The season lasts from May until October.

In the open pan method, a long narrow shallow pan, equipped usually with flues the entire length, was heated at one end. These pans varied from 40 feet to over 100 feet in length, from ten to 25 feet in width, and from ten to 18 inches deep. Generally they were divided by lateral partitions, the brine overflowing from one compartment to the other. In some cases the pans were operated until a sufficient quantity of salt had collected. They were then emptied by raking out the salt and draining off the "bitterns." In other localities mechanical rakes removed the salt as it formed, and the "bittern" was only drawn off when impurities began to separate.

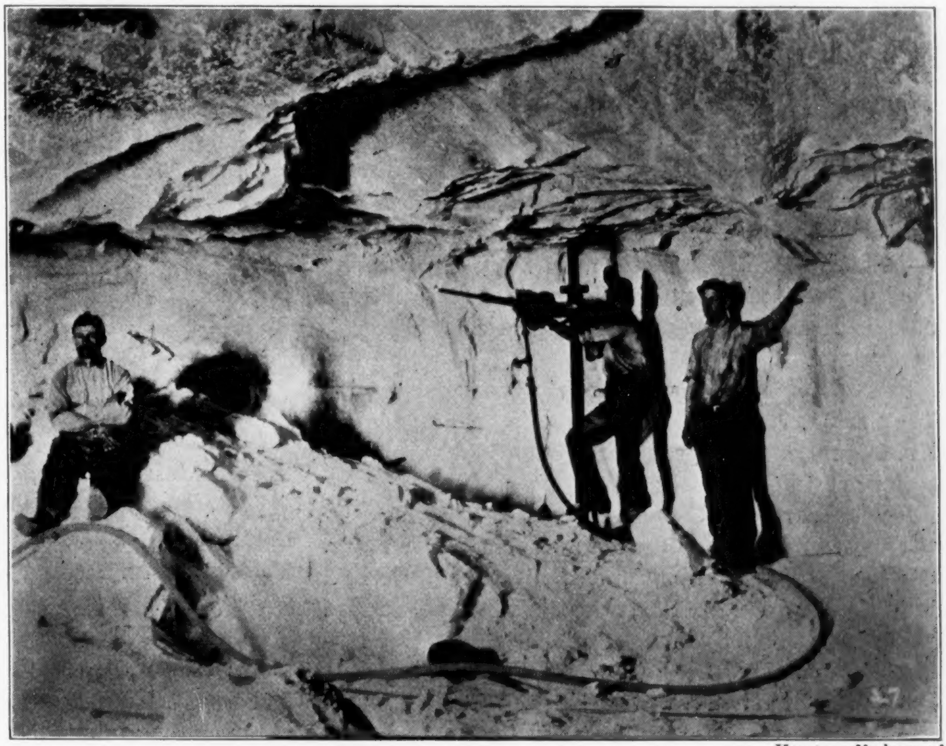
The "grainer" method originated in Michigan and is sometimes called the "Michigan" method. The idea back of the system was the utilization of the waste steam of the then extensive Michigan lumbering operations. The grainer is a long shallow tank made of iron, wood, or concrete, containing three inch steam coils. Older types were raked by hand. New types employ mechanical rakes in constant motion which agitate the liquor and produce smaller crystals. The salt as it leaves the pans is exposed to steam which dissolves out the more soluble chlorides of magnesium and calcium. It is finally whizzed and dried.

Unsuccessful attempts were made between 1839 and 1887 to use the vacuum method for the industrial production of salt. The difficulty of separation of calcium sulfate depositing on the steam pipes was overcome by purifying the brine before evaporation. The multiple effect system is now widely used and is so constructed that the flow may be reversed, in order to make it self-cleaning. One of the latest installations will produce 1,000 tons a day.

In certain parts of the world artificial heat is replaced by natural or "solar" heat for the evaporation of brine. In this country the solar method is practically limited to California (in the vicinity of San Francisco) and in Utah at the Great Salt Lake. The idea is nearly as old as the sea itself. Records show that over 2,000 years ago salt was produced on the shores of the Dead Sea for curing hides, domestic purposes, and as a medium of exchange.

Approximately 97 per cent. of the California production is by the solar method. The usual salt content in sea water is about 3.72 per cent. A large plant in California, capable of producing 10,000 tons a year, covers nearly 2,000 acres, divided into seven basins, requiring 15 miles of levees. Ponds protected by tide gates are flooded from the ocean at high tide every two weeks. The water is pumped into secondary basins where the level is maintained constant. By a transference from one pond to another the concentration is gradually built up to about 35-36 per cent. and most of the impurities removed. The concentrated brine is then treated according to the type of salt desired. The season in California runs from May until October. Compared with the total consumption in this country, the amount produced in California by the solar process, is of small importance. This is partly due to the fact that salt, being such a cheap commodity, cannot be profitably marketed at great distances in the face of abundant production in the densely populated eastern centers.

Rock salt mining like the solar process is "as old as the hills." In parts of Europe, specially Galicia, salt mines have been worked for hundreds of years. The essentials of the method have not varied, although mine equipment has been in most cases thoroughly



Salt mining was one of our earliest industries and still is a highly important source of our salt requirements. Modern methods are now generally employed in the industry. A central shaft is sunk and galleries, often a mile in length, radiate out like the spokes of a wheel. Approximately 37 per cent. of the salt is left as supporting pillars.

Keystone-Underwood

mechanized. Shafts are sunk and galleries are run out, often a mile or more in length. The salt is under-cut and then blasted down with low-charge dynamite. The salt dislodged is conveyed to a mill where it is crushed and screened. Where it is inconvenient to sink shafts down into salt deposits located deep in the ground and in all cases where the salt is required in the brine stage, for example, in the manufacture of alkalies, concentric pipes are sunk. Hot water is forced down to become saturated with salt. By the action of gravity the saturated solution is forced upwards. One hundred pounds of water will pick up 35 pounds of salt, making what is known as a 26 per cent. solution. Nearly one-half of our entire salt requirements are obtained by this method. The following table shows salt sold or used by producers in 1930 and 1931, by methods of manufacture.

	1930		1931	
Method of manufacture	*Short tons*	*Value*	*Short tons*	*Value*
Evaporated in open pans or grainers	707,330	$6,355,341	589,130	$4,540,095
Evaporated in vacuum pans [1]	1,163,630	7,875,537	1,158,190	7,504,399
Solar evaporated	353,080	1,234,621	326,500	1,148,970
Pressed blocks from evaporated salt	134,570	1,079,372	129,870	983,652
Rock	1,935,220	6,157,422	1,819,700	5,542,281
Pressed blocks from rock salt	42,150	234,353	34,470	192,926
Salt in brine (sold or used as such)	3,718,460	2,072,834	3,300,210	1,628,689
	8,054,440	$25,009,480	7,358,070	$21,541,012

[1]Including salt manufactured by the spray system of cooling in 1931.

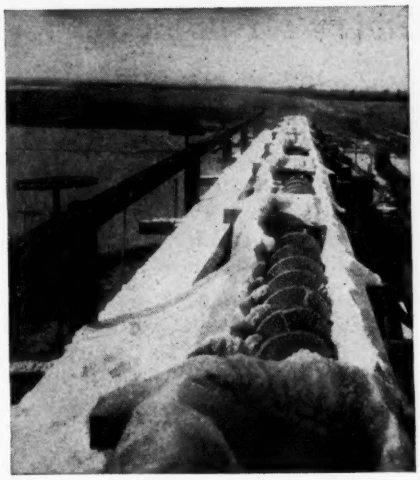
For a number of purposes, including of course table use, natural salts must be purified. Solar salt is usually treated by allowing the brine to flow through a narrow box and the solid salt carried through by a screw conveyor. The salt is then washed by spraying first with sea water and then with fresh water. The washings are returned to the beginning of the operation. Rock salt is often treated in a similar manner, a solution of pure salt in pure water being used for the washing.

Calcium and magnesium salts, chief impurities in brine, are precipitated out as insoluble salts by the addition of tri-sodium phosphate, soda ash, and lime or soda ash with caustic soda. Thus we are treated to the spectacle of "child" alkali helping "parent" salt to get "well." More modern practice consists in electrolyzing a portion of the brine to produce a small amount of caustic. Carbon dioxide is forced through the solution and carbonate is formed. This solution is then added to the main body of brine, and the iron, calcium and magnesium salts are precipitated out. After a filtering operation the solution is evaporated.

Salt of commerce is divided into several grades. They are 1, 2, 3, 4, C fine, packer's fine, and lump. No. 1 is most used; grains are about 1/8 inch; No. 2, grains are 1/8 to 1/4 inch; No. 3, over 1/4 inch; No. 4, coarse evaporated. C fine is from No. 1 down.

The manufacture of salt is but half the story. Where is it sold and consumed? With sulfuric acid and lime it enjoys, perhaps, the most widely diversified market of any of the industrial chemicals. Unfortunately no reliable statistics are available showing the tonnages employed in these different fields. The principal consuming industries are:—

Abattoirs—Salting hides, casings, fertilizers.
Agriculture—Fertilizing, hay salting, weed exterminators.
Animal Consumption—Direct and in feed mixtures.
Baking Industry—Breadstuffs, crackers, pretzels.
Chemical Industry—Acids, alkalies, chlorine, soda products, detinning.
Canning Industry—Fish, meats, vegetables, soups, catsup, pickles, sauerkraut.
Clay and Clay Products—Ceramics, glazing, vitrifying.
Dairy—Butter, cheese, feed mixtures, stock feed, refrigeration, food preservatives, butterine.
Dye Manufactures and Dyeing—Dyes and dyeing cottons, silks, rayons, and woolens. Also water softening.
Drug Manufactures—Drugs, medicines, bath salts, insecticides, carbonated waters, remedies, paints.
Fishing Industry—Curing fish, canning, salting nets.
Food Product Manufactures—Condiments, sauces, dressing, chowders, salting nuts.
Glass Industry—Plate glass, bottles.
Highway Departments—Dust palliative, ice and snow.
Human Consumption—Direct and indirect consumption.
Ice Cream Industry—Freezing and packing ice cream.
Iron and Steel Industry—Rolling mills, plate steel, wire, smelting.
Knitting Mills—Bleaching and dyeing, water softener.
Laundries—Bleaching, water softener.
Lumber Industry—Wood preservative.
Meat Packing—Curing meats, packing, pickling, hides, casings, preservative for all kinds of food.
Millers, Flour and Feed—Stock feed, self raising flours, cereal.
Natatoriums—Bathing.
Paper and Pulp Industry—Bleaching acids.
Power and Light Plants—Water softener, filtering, grounding.
Oil Refiners—Water softening.
Railroads—Track purposes, thawing ice and snow, weed exterminator, refrigerating.
Refrigeration and Cold Storage—Cold storage.
Ice Manufactures—Artificial ice.
Rayon Industry—Bleaching, dyeing, water softening.
Rendering Plants—Lard, tallow, hides, casings, fertilizers.
Soap Industry—Soap, soap powders, cleaning compounds, sweeping compounds.
Sanitariums—Rubbing and bathing.
Textile Industry—Bleaching, dyeing, water softening.
Tanners and Tanning—Curing and tanning of hides and leather, preservative of hides.
Tobacco Manufactures—Processing and manufacturing plug tobacco.



A novel method of conveying salt in the "solar" method of salt production. A Caldwell screw conveyor provides an economical means of transferring salt from ponds to refining plants.

Salt's role in all of these industries is an important one. Still, it is undeniably true that most of the uses listed are ones that have been in practice for years, many for centuries. New uses for salt as salt have been few and far between. New uses for by-products of salt manufacture, while not numerous, have been of profound character and have contributed generously to civilization's advance. This is true also of products made indirectly from salt.

America's industrial growth in the past 25 years has been based to a considerable degree upon our ability to produce alkali abundantly and cheaply. Until our emancipation in soda ash, caustic soda and other alkalies our chemical industry was indeed a feeble affair. That emancipation was only possible because of our superabundance of salt supplies. The location of salt more than any other single factor determined the location of our alkali industry. The close affinity existing between salt and alkali is best appreciated when it is recalled that Ernest Solvay, originator of the ammonia-soda process, was the son of a salt manufacturer.

An analysis of the growth of the alkali industry in the past decade will throw considerable light on the reason for the jump in the per capita consumption of salt. The statistics are as follows:—

Total U. S. Production	*1929*	*1919*	*Gain*
Soda Ash (short tons)	2,682,216	1,507,424	1,175,792
Caustic Soda (short tons)	761,792	312,736	449,056
Chlorine (lbs.)	398,943,703	91,141,000	307,802,703

From these figures it is evident that within the space of ten years our production of ash almost doubled, our production of caustic more than doubled and our production of chlorine more than tripled.

More impressive is the growth of the alkali industry in terms of tons of salt. For the manufacture of chlorine two tons of salt are necessary to make a ton of finished product. Approximately 307,800 tons more of salt were consumed by the chlorine industry in 1929 than in 1919. For the manufacture of a ton of soda ash approximately 1.7 tons of salt are consumed. About 1,998,849 tons more of salt were consumed in ash making in 1929 than in 1919. For both ash and chlorine the total increase amounts to 2,306,649 tons of salt. This figure is open to some question, because of improvement in processes, etc., but for general purposes it is quite accurate.

Now if we examine the total production figures for salt in 1919 and 1929, we find that in the former year 6,882,902* tons were made and in the latter, 8,543,560 tons—a net gain of 1,660,658 tons, or an amount less than the total amount required by the expansion in the alkali industry in the decade. In other words, the tonnage of salt aside from the production of alkalies declined in the year 1929 when compared with 1919. It is safe to assume that the comparison for these two years represents the normal trend in the ten year period. It is well to remember that the per capita consumption of salt increased only ten pounds in the ten years between 1920 and 1930. The big gains in per capita consumption were made in the years 1890 to 1910, the years when our alkali industry was growing from infancy to manhood.

Salt and Modern Refinement

The wholly amazing list of chemicals now produced from salt is one of our most interesting chapters of industrial development. The family tree is now so large that it is only possible to point out some of the more famous and important of the great-great grandchildren of Grandpa Salt. Many men have contributed to this "synthesis." The late Herbert H. Dow would have been the first to acknowledge the noteworthy achievements of others, but, he beautifully typifies the breadth of activity that has taken place with our salt resources. Yet, even he with all his vision did not see mirrored in his first Midland brine-wells furniture, airplanes, dirigibles, and in the panic of 1933, money made of magnesium, nor houses covered with stucco, nor "horseless carriages" being propelled with "ethylized" gas. Our magnesium metal industry born only 18 years ago, and sickly for several years, has now become robust with an annual tonnage of 80,000 tons. As late as 1927 our total requirements of bromine amounted to only 500 to 1,000 tons annually. In 1931 we needed over 4,000 tons to take care of the demand for ethylene dibromide necessary to the manufacture of "ethyl gas." It was impossible in 1890 (the beginning of the Dow Company) to visualize the hundreds of important chemicals that have been developed by that company and others, and consumed in hundreds of different industries.

Iodine, third of the important by-products of salt, is receiving much attention recently after a serious domestic neglect for years. Likewise a by-product of the Chilean nitrate industry threat of abundant supplies was alway facing any prospective domestic iodine producer. Within the past two years we have

*Contains a small total for Hawaii and Porto Rico.

undertaken the production of approximately one-quarter of our domestic requirements with new plants at Los Angeles and Shreveport.

The salt industry is facing after years of stability, insofar as the geographical location of our commercial sources are concerned, a possible change or more properly a sizable new addition. It has long been known, of course, that large salt domes existed alone and in connection with the oil and sulfur deposits in Texas, Louisiana and Oklahoma. To some extent these have been worked for salt. By far the major portion of Louisiana's salt output of 525,000 tons in 1931 came from the rock salt mines, known, however, and operated for years. Texas' output was included in the figures for a number of other states. Nevertheless within the past two years a number of the oil companies have been viewing the possibilities of salt production and chemicals derived from brine. One at least, Texas Oil, has definitely entered the chemical industry. Through a subsidiary, Texaco Salt Products, it plans an extensive development program at Tulsa, and the marketing of salt, calcium and magnesium products, bromine and bromides. It is still much too early to say what effect the entrance of brand new producing factors will have on the markets for these products.

Our Ample Resources

No survey of any essential raw commodity is complete without a word about future resources. In this particular instance our supplies are practically inexhaustible. Indicative of what we still have to draw upon consider just two sources. Over 4,500,000 cubic *miles* of salt are still in the sea; within the states of Kansas, Oklahoma, Texas, Colorado and New Mexico lies a salt deposit with an area of over 100,000 square miles. Finding new salt supplies will cause little worry to succeeding generations.

Salt Sold or Used by Producers in the United States, 1922-193 1

	Short tons				*Value**	
Year	*Manufactured (evaporated)*	*In brine*	*Rock salt*	*Total*	*Total*	*Average*
1922.......	2,276,683	2,569,042	1,947,124	6,792,849	$27,464,838	$4.04
1923.......	2,239,872	2,787,239	2,103,602	7,130,713	27,795,941	3.90
1924.......	2,224,555	2,513,853	2,064,707	6,803,115	25,747,048	3.78
1925.......	2,235,170	2,819,690	2,342,640	7,397,500	26,162,361	3.54
1926.......	2,198,060	3,037,820	2,135,720	7,371,600	25,055,012	3.40
1927.......	2,263,030	3,161,800	2,143,860	7,568,690	24,817,962	3.28
1928.......	2,430,050	3,426,870	2,217,780	8,074,700	26,772,568	3.32
1929.......	2,546,390	3,884,160	2,113,010	8,543,560	27,334,695	3.20
1930.......	2,358,610	3,718,460	1,977,370	8,054,440	25,009,480	3.11
1931.......	2,203,690	3,300,210	1,854,170	7,358,070	21,541,012	2.93

*The values are f. o. b. mine or refinery and do not include cost of cooperage or containers.

Salt production has never, at least in modern history, been a very profitable venture. It is not difficult to produce, deposits are numerous, competition is terrifically keen. On the other hand, the industry has fared better in depression times. Prices were ruinous from 1923 to 1928 when conditions improved. Since then the price structure has remained fairly stable when the general commodity price structure has been tumbling. Strange as it may seem salt companies in general have shown better balance sheets in the past few years than they did in the boom period.

The Industry's Bookshelf

Official Directory of the British Chemical Plant Manufacturers' Association, published by the Association and distributed gratis to buyers of chemical equipment, 166 Piccadilly, London, W. 1 England.

The 1933 edition continues the high standards for completeness set by previous editions. The same is likewise true of the 1933 British Chemicals and their Manufacturers prepared by the Association of British Chemical Manufacturers (above address).

Casein—Its Preparation and Technical Utilization, by Robert Scherer—Third English Edition, revised and enlarged by H. B. Stocks, 213 p., published by Scott, Greenwood (England) D. Van Nostrand & Co., 250 4th ave., N. Y. City. $4.00.

This recognized standard authority on casein (first printed in Germany in 1905) has been enlarged and thoroughly revised, bringing it up-to-date on new applications. The first part treats with the actual preparation of casein. Then follows a description of the use of casein in the manufacture of paints, distempers, putties, plastic masses, artificial ivory, and other materials; the modes of applying these and their special features.

Foreign Exchange, by A. C. Whitaker, 466 p., published by D. Appleton & Co., 35 W. 32 st., N. Y. City. $5.00.

A complete revision of the book that has been a standard treatise on foreign exchange since 1919. With industry crying out against foreign depreciated currencies and demanding protection from an alleged flood of imports from countries off the gold standard, the average business man has found need of knowing in greater detail the intricacies of exchange. Where such need exists this book will amply supply the answers in a plain intelligible manner.

The Methods of Cellulose Chemistry, by Charles Dorée, 499 p., published by D. Van Nostrand Co., 250 Park ave., N. Y. City. $7.00.

A handbook for the student of cellulose. Book is largely based on the author's notes made for his classroom lectures and laboratory work. It should prove particularly valuable to the student about to undertake research in the wide field offered by cellulose and the substances associated with it in the plant world, and also to workers in laboratories controlling and investigating the manufacture of cellulose products.

Annual Reports of the Progress of Applied Chemistry, published by Society of Chemical Industry, 46 Finsbury Square, London, E. C. 2 728p. Price to members, 7s.6d., to others, 12s.6d.

A survey of the industrial progress in 27 different divisions of chemical or allied industries made in 1932, each chapter being contributed by an outstanding authority. One of the most important annual contributions to the literature.

The Story of the Minerals, by Herbert Percy Whitlock, 144 p., published by The American Museum of Natural History, N. Y. City. $1.

A bried outline of the more important minerals written in a style that makes for delightful reading. A book a layman will find particularly interesting and instructive. The material is largely based on the marvelous mineral collection of the Museum, famed throughout the world.

Practical Color Simplified, by William J. Miskella, 113, p. published by Finishing Research Laboratories, 736 Lyman ave., Chicago, Ill. $3.50.

A particularly valuable handbook for all who deal with the problem of colors. It answers in a simple but authoritative manner many of the technical questions that arise in proper handling of decorative schemes. An innovation is the Finishing Color Chart, made up in three parts, which mechanically enables the reader to select warm and cool colors, mix colors to obtain any shade, harmonize three or more colors, and to avoid color discord.

Witherite

As a Chemical Raw Material

By H. Conrad Meyer

WITHERITE or natural barium carbonate is a relatively rare mineral. It is quite brittle, the hardness ranging from 3 to 3.75 (Mohs scale). The specific gravity ranges from 4.29 to 4.35 (Barite is 4.3 to 4.6). The lustre of the mineral on fractured surfaces is vitreous inclining to resinous. It is sub-translucent. The color is white, often yellowish or grayish, frequently stained with a small percentage of carbonaceous matter. The mean refractive index in sodium light is 1.53; specific heat 0.1096; fusibility 2.

Witherite generally occurs in pockets along the course of barite veins, although occasionally it is disseminated in small particles through a lode. In the British Isles only three workable veins, with witherite as the main constituent, are known. Many of the deposits, from which witherite has been obtained in limited quantities in the past, were first worked as lead mines by the Romans during their occupation of Britain, beginning about 85 A. D.

Natural barium carbonate was first identified by a Dr. Withering, a physician of Birmingham, while examining a collection of British minerals from an old lead mine on Alston Moor. The discovery was made in the year 1783, and the mineral was named in his honor. A few years later, about 1785, witherite was found in commercial quantities in a lead mine on Anglezark Moor near Chorley in Lancashire. Unknown to the owners, this deposit was worked illicitly for a time by one of the tenants, who gathered the ore by moonlight and shipped quite a large quantity to Germany, where it was reputedly used in the manufacture of porcelain. The price received was five guineas per ton.

With but a few exceptions, all British witherite is obtained as what might be regarded a by-product in the mining of lead ore (galena), zinc ore (sphalerite) and barytes. Where the witherite and barytes occur intimately associated, it is economically impossible to separate them, owing to their almost parallel specific gravities. The presence of any appreciable quantities of barytes, galena, zinc blende, limestone or pyrite in witherite is highly detrimental to its commercial application. It is obvious that the run-of-mine ore must carry little or no barytes, or in fact any mineral of a specific gravity close to that of witherite (4.29 to 4.35), as otherwise a high grade concentrate is impossible.

A typical analysis of a standard concentrate shows the following:

Barium Carbonate	91.25%
Calcium Carbonate	1.60%
Magnesium Carbonate	0.30%
Barium Sulfate	4.10%
Ferric Oxide	0.25%
Alumina	0.50%
Silica	1.15%
Carbonaceous	0.55%

The leading British producing mine has a potential output of from 10,000 to 15,000 tons per annum for at least the next thirty to forty years.

Superiority of Witherite Over Other Barium Ores

Other sources of witherite have been discovered from time to time but all of them are what might be termed "specimen localities." Dana reports it from Tarnowitz in Silesia; Szlana, Hungary; Leogang in Salzburg; Peggau in Styria; Zmeov in the Altai Mts.; Kentucky, and Thunder Bay, Lake Superior. In addition to these older localities may be noted certain barytes deposits in California and Alaska. In both these instances the witherite appears to be intimately associated with so much barytes as to make it of doubtful commercial value, in view of the long British experiences.

Being a carbonate, witherite lends itself to chemical treatment more readily and economically than the only other commercial source of barium, namely, barite. It is readily decomposed by all mineral acids and many of the organic acids, with the formation of the corresponding salt. The barium oxide content of a standard witherite concentrate is close to 75%, as against a barium oxide content of only 65% in barite,

the sulfate. Furthermore, the preparation of barium products from barite involves the conversion of the very inert and refractory sulfate to the sulfide by expensive furnacing operations. The sulfide is then converted into artificial or precipitated carbonate, from which point the preparation of other barium compounds is much the same as if witherite were used as the basic raw material. Unfortunately, the demands for barium compounds are so far in excess of available witherite supplies that the industry is compelled to use barite, which is very abundant and commands a somewhat lower price than the natural carbonate.

The natural carbonate appears on the market in three forms: first, as a coarsely ground product; second, as an air-floated, impalpable powder; and third, as lumps or smalls. Normally the consumption of coarsely ground or air-floated carbonate in the United States is much greater than lumps or smalls. It has been demonstrated in certain industries that the efficiency of natural barium carbonate is directly proportionate to the fineness of the particles, and such fineness can only be economically secured by carefully controlled air-flotation.

The normal commercial demands for natural barium carbonate are, in about the order of their importance, as follows:

1. Case-hardening.
2. Sugar refining.
3. Heavy clay products.
4. Barium Peroxide.
5. Water and brine purification.
6. Barium chemicals.
7. Glass and Enameled Iron Ware.

Barium peroxide is sometimes known as barium dioxide and is employed principally in the production of hydrogen peroxide. Hydrogen peroxide appears on the market in the form of an aqueous solution and is used in bleaching fine fabrics, especially woolens and silks, also ostrich feathers and ivory. It is also used as an antiseptic wash. Considerable quantities of hydrogen peroxide are now being produced by an electrolytic process which does not depend for its economy on the sale of a by-product like blanc fixe, and this has interfered to some extent with the consumption of barium peroxide in this field. Barium peroxide is a white powder, stable under ordinary conditions, if anhydrous, and protected from carbon dioxide. It melts at a bright red heat with the evolution of oxygen. It is prepared from either barium nitrate or barium carbonate (witherite), preferably the latter, for economic reasons. The carbonate is first converted into barium oxide by heating with carbon or coke and the resultant product is then converted into barium peroxide by heating in specially designed furnaces at around 700 deg. C., while a current of air free from carbon dioxide and moisture is passed over it. At this high temperature the barium oxide readily absorbs oxygen. By treating barium peroxide with sulfuric acid, the following reaction takes place: $BaO_2+H_2SO_4=H_2O_2+BaSO_4$. The precipitated barium sulfate or blanc fixe is filtered off and the clear solution contains the hydrogen peroxide. This solution is purified and concentrated, if necessary. Blanc fixe is a very valuable by-product and in normal times commands a good price. It appears on the market in the form of paste and also as a dry powder.

Water Purification

The application of natural barium carbonate for water softening is closely allied to its use in heavy clay products. In other words it is used as a precipitant of soluble sulfates, which when present in appreciable quantities in the water used for industrial purposes, is highly detrimental. Indeed, water often used for drinking purposes is frequently not pure enough for industrial purposes. This is particularly true of boiler feed water, water for sugar refineries, tanneries, paper mills, laundries and dyeing. In all of these industries the presence of calcium, magnesium and sodium sulfates is highly injurious, and before such water can be used it is necessary to soften it or in other words precipitate these salts, which cause both temporary and permanent hardness. It is claimed that barium carbonate possesses distinct advantages over soda ash in the treatment of water carrying a high percentage of sulfates. Although it has a low solubility, it can be added to the water in suspension. Any excess above the quantity required for the removal of the sulfates present, settles with the precipitate and can be easily removed. On the other hand an excess of soda ash cannot be so easily gotten rid of. A combination of barium carbonate, soda ash and lime is sometimes used. It should be understood that the use of barium carbonate for water softening purposes is not applicable where the water is to be used for drinking purposes, inasmuch as barium salts are poisonous in comparatively small quantities.

A great deal of attention has been given recently to the removal of calcium sulfate from salt brine. Where the brine is to be used in the manufacture of sodium salts for industrial use, or chlorine, air-floated barium carbonate can successfully replace the more expensive barium chloride largely used at the present time. The problem of brine purification with witherite is not so simple where the finished product is salt intended for table use, although it is hoped that some safe process can be developed by which any traces of barium remaining in the salt can be completely removed.

Various barium chemicals have important worldwide commercial applications. The use of witherite or natural barium carbonate as a basic raw material has decided advantages over barite, but unfortunately the production is limited. All of the following principal barium chemicals can be produced with ease from the natural carbonate or witherite: blanc fixe (precipitated barium sulfate), barium chloride, barium nitrate, barium hydroxide and barium peroxide.

It is claimed that the blanc fixe produced from witherite is much purer and has superior physical properties to that produced from barytes. The method of manufacture consists in dissolving the witherite in hydrochloric acid, filtering and precipitating barium sulfate by means of salt cake (sodium sulfate). By varying the temperature of the solution at the time of precipitation, material of varying characteristics can be produced. Blanc fixe is largely used for pigment purposes and is superior for this use to finely ground barytes. It is principally used where a pure white pigment or filler is desired, as in paints, rubber, linoleum, oil cloth and glazed paper. The very finest grade of photographic paper manufactured is coated with blanc fixe produced from witherite. Blanc fixe is also used in printing inks and as a base for lake colors. The chemically pure grade is used in medical X-Ray photography. It appears on the market as a dry powder and also as a paste containing about 30% of water.

The Barium Chemicals

This is a white, non-hygroscopic, crystalline salt freely soluble in water. It can be prepared from witherite either by solution in hydrochloric acid or by heating with ammonium chloride or calcium chloride. It is largely used in the manufacture of blanc fixe, lake colors, and as a mordant for fixing acid dyes on an inert base such as aluminum hydroxide or blanc fixe. It is also used as a water softener and to a lesser extent in the ceramic industry and in the manufacture of certain photographic chemicals. It is an important chemical reagent for the determination of sulfur.

Barium nitrate is readily prepared by neutralizing nitric acid with witherite. This salt, as ordinarily obtained, is anhydrous. When heated strongly, it decomposes, giving barium oxide or barium peroxide. It has a much lower solubility than the chloride. It is used principally in the manufacture of fireworks, in the production of green fires and signal lights, and also in the manufacture of primers, detonators and flares. It is used to a lesser extent in the manufacture of barium peroxide.

This comes on the market in the form of white plate-like crystals containing eight molecules of water of crystallization. It is one of the most soluble of all the barium salts and is a strong base. It has been used for the conversion of potassium sulfate into caustic potash, but the most important use at the present time is in the desaccharization of sugar beet molasses.

This barium compound is used chiefly in the manufacture of hydrogen peroxide, as has already been previously mentioned.

In addition to the above barium chemicals, of which large quantities are consumed annually, there are quite a number of others, the consumption of which at the present time is relatively small but which possess potential applications. The most important of these are the following:

Barium chromate is a pale yellow powder produced by the action of sodium chromate solution on a soluble barium salt. It is stable at red heat and for this reason is used as a ceramic color for porcelain and china. It also finds use as a yellow pigment, sometimes known in the trade as "yellow ultramarine" or "lemon yellow."

Barium chlorate is formed by the neutralization of barium hydroxide or carbonate with chloric acid. It readily explodes when mixed with a reducing agent and finds application in pyrotechnics for a green fire, and to a less extent in dyeing.

Barium manganate is used as a pigment under the name of Cassel's Green, Manganese Green or Rosenthiel's Green. It can be formed by heating a mixture of barium peroxide and manganese dioxide.

Barium selenite is obtained by precipitation from solutions of barium nitrate and sodium selenite. It is sometimes used in the glass industry as a decolorizer and also for the production of ruby glass.

Barium titanate is prepared by heating a mixture of rutile (natural titanium oxide) and witherite. This process has been patented as a method for the production of pure titanium oxide pigments.

Barium fluosilicate is obtained by precipitation of a barium salt with hydrofluosilicic acid. Its use as an insecticide or spray for apple orchards was developed by the Department of Agriculture, State of Washington.

Barium aluminate is produced by the fusion of bauxite (aluminum oxide) and witherite. It is used as a water softener, principally for locomotive boilers.

Barium stearate is produced by the action of stearic acid on barium chloride. It is used as an insoluble packing material for bearings in pumps used in handling strong alkaline solutions.

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European Solid Carbon Dioxide Industry

There are now in Europe 53 factories manufacturing solid carbon dioxide. Of these, eleven are in Germany, nine in France, two in Spain, eight in Italy, one in Jugo-Slavia, two in Hungary, one in Austria, three in Switzerland, three in Belgium, one in Luxemburg, one in Holland, five in England, two in Norway, two in Sweden, three in Russia, one in Czecho-Slovakia, and two in Rumania. A number of further works are projected, several new plants being already under construction. The patented processes utilized include the Carba-Schutz, the Linde-Surth, the Stapp-Freundlich, the Esslingen-Garko, and the Pegna.

Some Facts and Figures on

Japanese Alkalies

By Charles E. Mullin

JAPAN does not produce sufficient salt to meet the domestic requirements and almost the entire production, in Japan proper, is made by the evaporation of brine by artificial heat. In Formosa, where the industry is a government monopoly, some 5,530 acres of salt fields were in operation in 1928, with a production of 148,350 tons by solar evaporation. Some salt is also produced in the Japanese occupied territory in Korea and Manchuria. In Japan proper the industry largely borders on the Japan Sea and produced 70,300,000 tons in 1928. During the same year, some 25,000,000 tons of salt,—valued at $1,866,121, were imported, largely from Formosa, Spain, and Tsingtas (the former German occupied territory in China). It is believed that of about 81,000,000 tons of salt used in Japan in 1927, the chemical industries consumed about nine per cent. and the manufacture of Japanese pickles, soya sauces, etc., about an equal amount.

Salt has been produced in Manchuria since about 1870, by evaporation. In 1928 the production was estimated at 200,000 tons from about 17,150 acres of salt fields. It is estimated that it will be possible to open up an additional 24,500 acres for the manufacture of salt, which may bring the total production up to about 750,000 tons. Only about 18,000 tons of soda ash have been produced annually in Manchuria but, as there has been difficulty in marketing the salt, it is expected that the soda industry will expand in the near future, probably now under Japanese "influence."

Average Wholesale Price of Salt in Tokyo
(*Per bag of 61 pounds, in gold dollars*)

Year	*Price*	*Year*	*Price*
1921	$0.995	1927	$0.89
1922	0.95	1928	0.89
1923	0.965	1929	0.81
1924	1.035	1930	0.78
1925	1.01	1931	0.70
1926	0.91		

Prior to the World War, alkalies were not manufactured in Japan and were chiefly supplied by England. This was partly due to the undeveloped state of the native chemical industry and partly to the fact that there is no abundant source of cheap industrial salt in Japan. Even today the absence of cheap salt greatly hampers the industry, which requires about 200,000 tons of salt to make the 100,000 tons of soda ash used annually in Japan. Most of the industrial salt is now imported from Shantung and Spain.

The Asahi Glass Co. was the first to undertake the manufacture of soda ash in Japan, and in 1915 took up a government project to establish an alkali industry, in order to meet the increasing domestic demands and decreased imports due to the war. The project was far from successful and a production of 20 tons per day was not reached until 1922. This was increased to 45 tons per day in 1925, and to 55 tons per day in 1926, with a prospect of 80 tons per day for the future.

The Japan Soda Co., established in 1918, was even less successful and closed its plant in 1924. It resumed operations in 1929 and was producing 40 tons a day, with prospects of increasing this to 80 tons daily. The Japanese government granted a subsidy for a period of five years, beginning with 1929. In 1930 the combined output of the two concerns was able to supply only about 16 per cent. of the nation's requirements. The imports of soda ash in 1928 and 1929 were 86,714 tons and 55,025 tons, respectively.

Sources of Japanese Soda Imports
(*Value in gold dollars*)

Country	*1929*	*1928*
England	$1,884,500	$2,753,000
United States	2,265,500	1,815,000
African Countries	1,093,000	1,579,000
China	327,000	276,000
All others	87,500	259,500
Total*	$5,657,500	$6,682,500

*Imports of caustic soda and soda ash for the first half of 1930 were $2,957,500.00.

Caustic Soda

Japanese production of caustic soda increased steadily from 1920 to 1925, reaching 28,903 tons in the latter year, but fell off some 3,000 tons in 1926. The combined capacity of all of the Japanese caustic producers was estimated at 29,000 tons in 1931. The Dai-Nippon Fertilizer Co., The Asahi Glass Co., and the Hokkaido Co. are the best known producers. The rapidly expanding viscose rayon industry of Japan is one reason for the steadily increasing demand for high grade caustic.

Japanese Caustic Soda Industry
(*In tons of 2000 pounds*)

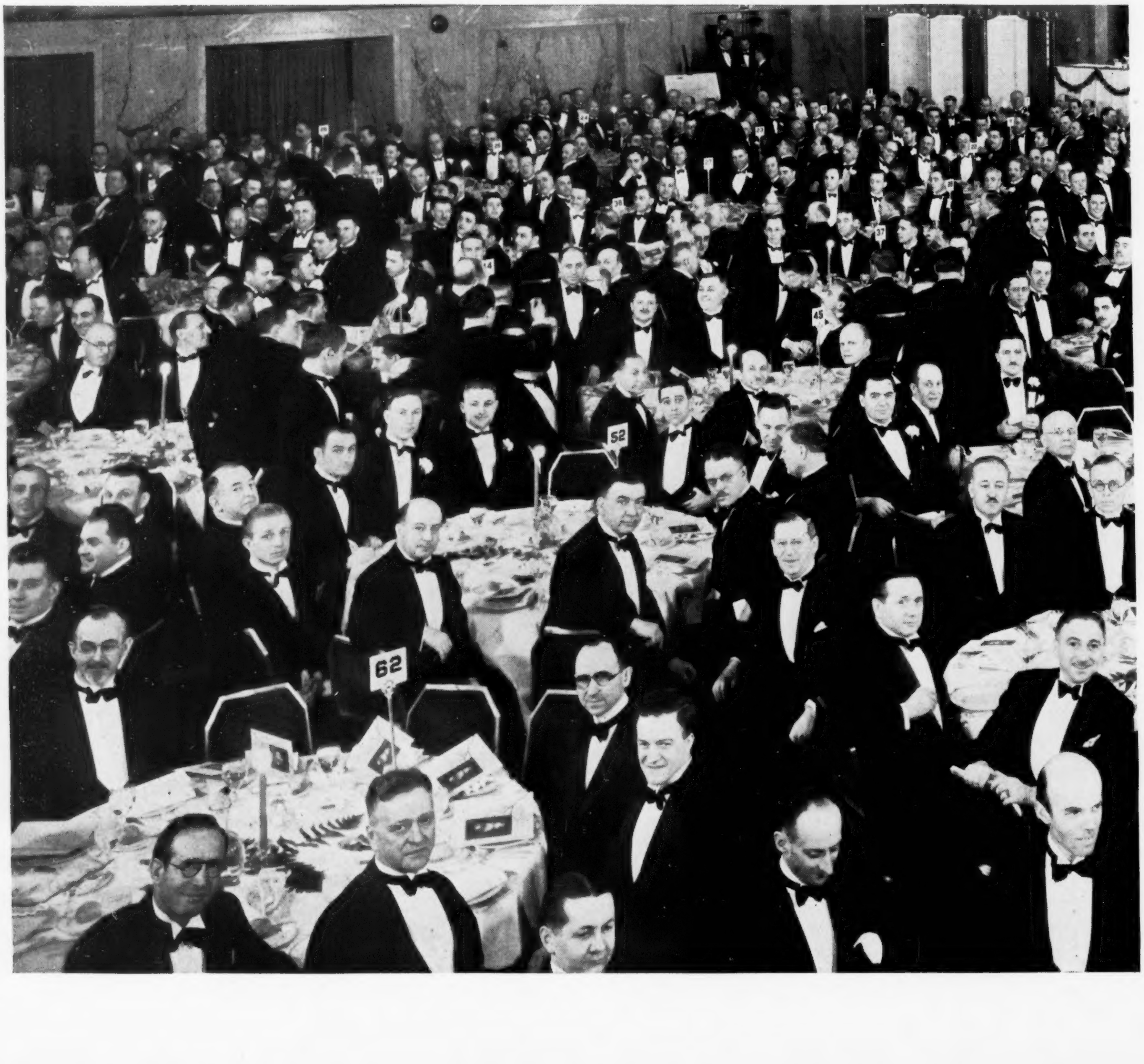
Year	*Production*	*Imports*	*Exports*
1927	27,523	45,496	60
1928	33,347	70,039	40
1929	34,036	42,639	20

In 1929, some 55,297 tons of bleaching powder were manufactured in Japan. Of this output, 43,330 tons were used in Japan and about 3,204 tons were exported.

CHEMICAL

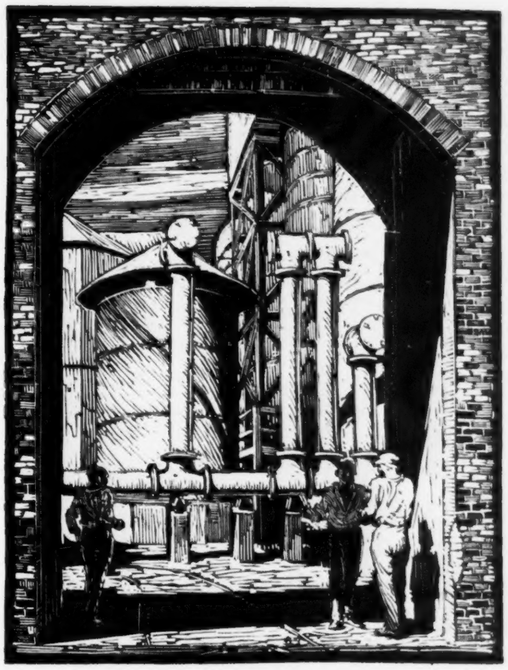
The Photographic Record

A new plastic-impregnated cloth makes its debut to the commercial world, bringing with it myriad uses for adaptation. The cloth is treated with a special flexible phenolic resinoid material which renders it resistant to water, oil, and most cleaning compounds. Another of its outstanding characteristics is flexibility. It is available in a variety of metallic finishes, patent leather, and printed effects; and may be had in different weights of cloth. When flexible and waterproof characteristics are desired, Revolite is said to offer special advantages, not only from the point of view of practical needs but also from that of economy. It is a product of the Revolite Corporation, a subsidiary of Johnson and Johnson Co.



NEWS REEL

of Our Chemical Activities



Paul Honore, who did the mural paintings at the National Research Council in Washington, and who is winner of the Marvin Preston Prize, 1917; the Walter Piper Prize, 1928; and the Detroit Museum Founders' Prize, 1917, has just finished a series of wood blocks of various scenes at the Dow plant at Midland. The plate to the right represents the Sulfur Burners. Other plates in the series depict the Chlorine Cells Group; Main Laboratories; Carbon Bisulfide Group; New Power House; Indigo Plant; and an interior of the Calcium Magnesium Group.

Below, left and right, is shown the photograph of the Eighth Annual Dinner of the Drug, Chemical and Allied Trades Section of the New York Board of Trade, Inc., recently held at the Waldorf-Astoria, to which chemical men flocked in great numbers.

Industrial Hydrogenation

An Economic Survey
by J. B. Phillips, Ph. D.

THE application of catalysis to chemical processes is one of the most fruitful fields of investigation at the present time, and the treatment of organic substances with hydrogen, to develop desirable properties in them, has been one of the most useful applications. Hydrogenation is carried out in industry today by methods based essentially on the simple procedures used many years ago by Sabatier, Willstätter, Ipatief, and others for hydrogenation in either the gaseous or liquid phase. The earliest application of these principles in the treatment of organic substances on a commercial scale was made by Normann, in 1903, in a patent for the hydrogenation of liquid fats.

The process of hydrogenation lends itself to very careful control, and the nature of the products can be varied to suit the demand. The most important factors in the control of the process are: *Pressure.*—High pressure has been of great advantage, on account of the volume contraction in the reaction, and also in influencing the course of the reaction in certain cases. *Temperature.*—This is important since the products may undergo dissociation or polymerization at high temperatures, while the velocity of the reaction is usually increased by raising the temperature. *Catalysis.*—The method of preparation of the catalyst has a great influence on its activity, those prepared at low temperatures often showing the greatest activity. The amount of surface exposed, particle size, and crystal form, are very important, rather than the actual weight of catalyst used. *Treatment of raw materials.*—In most hydrogenation processes very sensitive catalysts are used, and poisons must be absent from the raw materials. Free fatty acids are also undesirable in the hydrogenation of fatty oils. *Time for reaction.*—Feed must be regulated to allow sufficient time for reaction in continuous processes.

The hydrogen may be manufactured by any of the following methods: (1) electrolysis of water, or as a by-product in the electrolysis of brine for caustic and chlorine: (2) iron sponge and steam, or iron and liquid water under very high pressure: (3) liquefaction of other constituents of coke oven gas or water-gas, leaving the hydrogen gas: (4) coke and steam. Two other processes which have been developed recently will be mentioned later.

The oils used are marine animal oils such as body, liver, and blubber oils, or vegetable oils such as cottonseed or soya bean oils. The fish oils are generally impure and high in free fatty acids and yield solid fats used mainly in soap manufacture, while the vegetable oils are comparatively pure and neutral and give solid edible fats of high purity.

The catalysts generally used are nickel and copper. Platinum and palladium are very effective, but are too costly for general use. Iron is also useful but acts very slowly. Nickel is very reactive but easily poisoned, while copper is not so reactive but more resistant to poisons: mixtures of nickel and copper have been used with good results. The nickel catalyst can be prepared by reduction of nickel sulfate, hydroxide, nitrate, formate, or carbonyl, on a carrier, or with a bulking agent such as kieselguhr, pumice, or clay. The raw oil must be deodorized, neutralized, and freed of stearin and protein material before hydrogenation, and the hydrogen used must be free from poisons.

The reaction is carried out in welded steel vessels, with suitable means of agitation, and steam and water coils to control the temperature. Pressure of about 15—25 lb. per sq. in. is employed and the temperature is kept at about 175° C. to avoid decomposition of the fats. The reaction product is filtered in a press, and the catalyst recovered for use again. The filtered oil is allowed to cool and solidify, the reaction, which is essentially a batch process, being carried on to the stage of hydrogenation desired.

The hardening of fatty oils represented for many years the main achievement in industrial hydrogenation, but more recently advances have been made in the technology of catalysis.

German Developments

In Germany, low-grade lignites and brown coal are used as sources of hydrogen and other products, and the producer and water gas obtained from them are carefully purified and mixed in proper proportions for the synthesis of ammonia. The tar removed in the purification is distilled, yielding oils and pitch, while sulfur compounds are removed from the gases by activated carbon, the free sulfur being recovered and sold in the form of brimstone.

Carbon dioxide from the impure gases, together with gypsum, ammonia, and nitric acid from the oxidation of ammonia, is used on a large scale in the making of urea, ammonium sulfate, and calcium nitrate, all valuable fertilizers, and purified water gas is used in the synthesis of methanol, zinc and copper oxides and chromates, being employed as catalysts. More recently the synthesis of higher alcohols from carbon

monoxide and hydrogen under high pressures has been accomplished by P. K. Frolich and co-workers.

Various attempts were made to apply hydrogenation to such materials as coal, lignite, peat, tar, etc., but this problem offered great difficulties on account of the impurity of the materials, and the sensitiveness of the catalysts. The Bergius process was finally developed (1913) in which pressures of 6000—7000 lb. and temperatures between 400°—500° C. were employed. The treatment consisted of cracking and hydrogenation. No catalysts were used, but small percentages of iron oxide were added to remove sulfur. The products contained appreciable percentages of undesirable cresolic bodies, and the process did not become commercially successful. The process was taken over by the I. G. Farbenindustrie and a very intensive investigation was begun to find catalysts which would be suitable for use with such impure materials, and to work out a process for producing hydrocarbon products free from phenolic and cresolic bodies. These efforts were successful, and it was found possible to produce gasoline, gas oil, kerosene, and lubricating oils, from lignite, brown coal, and tars. This process, in conjunction with the low-temperature carbonization of coal, is a very important factor in the utilization of low-grade fuel resources in Germany.

Investigations carried out at the Greenwich Station show that by treatment of non-coking British coals with very small proportions of hydrogen under pressure, the material is converted into a coking coal with very desirable properties, and by further hydrogenation the coal can be liquefied. This process may be of great value at some future time.

Newer Uses of Hydrogen in Industry

Recent catalytic processes for treating such substances as benzene and its derivatives to give saturated cycloderivatives such as cyclohexane and cyclohexanol, as well as reduction products such as tetralin and aniline, are examples of newer uses of hydrogen in industry.

The most interesting and remarkable development in the field of hydrogenation as far as Canada and the United States are concerned, has been in the petroleum industry. Considerable work has been done as a result of which it is now possible to treat high-asphaltic high-sulfur crude oils and refinery residues with hydrogen under proper conditions of temperature and pressure to yield only white distillate products if desired. The reactions are carried out at 3000 lb. pressure, and at temperatures about 500° C. After cooling, the liquid products may be given a further finishing treatment, or if desired may be subjected to cracking in the vapor phase. This process is already in actual operation to a limited extent for producing gasolines, gas oils and refined burning oils, all of which are characterized by their low sulfur content and freedom from undesirable decomposition and polymerization products. Gasolines of high anti-knock rating can be produced if desired. In addition, lubricating oils of premium quality are produced, and these have been found to have very desirable properties as regards flash, residual carbon, gravity, and viscosity-temperature relationships. The process is very flexible, and any or all of the above products can be produced in the same plant by changing the operating conditions. The process is characterized by the absence of formation of tar and coke, elimination of sulfur, resistance of the catalysts to sulfur and other impurities in the feed, and the high pressures and temperatures at which the reactions are carried out. This most recent development of hydrogenation will probably lead to fundamental changes in the methods of treating petroleum materials in the future. It is also possible that a similar process of hydrogenation with cracking will be applied to convert coal tar into materials of higher value such as benzene, motor fuel, and toluene.

Cobalt Supplies

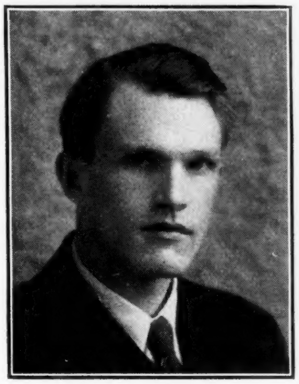
In the years immediately preceding the war the average annual world production of cobalt, in terms of metal, was 400 tons, of which 99 per cent. came from Canada and about one per cent. from Germany. In the post-war years the German cobalt industry still further declined, and came practically to an end about 1928, although Germany has preserved its leading position as a manufacturer of cobalt compounds from imported raw materials.

Since 1924 world production of cobalt has moved rapidly upwards, amounting to 810 tons in 1924 to 940 tons in 1927, and to 1,280 tons in 1929. This last-mentioned figure marks the peak, for in 1930 production fell to 1,120 tons, and in 1931 to only about 700 tons. In this last-mentioned year about 53 per cent of the world's supplies came from the Belgian Congo, about 33 per cent. from Canada, and about 14 per cent. from Burma. Canadian output has been maintained since the war at approximately 400 tons a year until 1930, when it dropped to 310 tons. Nineteen hundred thirty-one saw the figure decline further to 234 tons, and the first half of 1932 to below 100 tons. The cobalt metal exported from Canada goes chiefly to the U. S. A., although the cobalt alloys come principally to the United Kingdom.

New Caledonia, which occupied the leading position as a world cobalt supplier in the early years of the present century, has not been producing at all since 1927. Shortly after the war a rich cobalt-ore deposit was discovered in Queensland, Australia. This was developed in 1921, and in 1923 produced 100 tons of cobalt. Owing to the competition of other and cheaper suppliers, however, the industry has declined, and accounted for only three tons in 1930. It is believed that about 200 to 300 tons a year of high-grade cobalt ores are worked up in China, but that the cobalt oxide produced is used entirely in the Chinese porcelain industry.

Output of the Belgian Congo

The most important factor today in the world cobalt market is the Belgian Congo, in which the production of the material from the Katanga mines commenced about 1922. Until 1928, in which year 450 tons of cobalt were produced, the Congo industry maintained about even strides with the Canadian industry. In 1929, however, Katanga produced about 700 tons, more than double the Canadian output. By 1931, however, output of cobalt from Katanga ores had dropped to 370 tons. The cobalt-containing material is shipped from Katanga to Belgium.—*Chemical Trade Journal.*



Chemical Preservation of Wood

By Gilbert Thiessen

State Geological Survey Division, State of Illinois

WOOD is the most widely used constructional material and will undoubtedly remain so for a long time.[1] Wood is inexpensive, generally available in a wide variety of kinds, grades, shapes, and sizes, and easily worked, if need be, by even the simplest of tools. Wood does not have a "cold" feel nor "sweat" in cold, damp weather. The sound-absorbing property of wood is an important consideration in home construction. Wood is criticized on the score of impermanence, but this depends upon the environment, and different varieties vary widely in resistance to decay.

Under conditions unfavorable to decay, wood is as permanent as any of the other so-called "permanent" building materials.[2] All materials are subject to one or more destructive agencies—for example, rust, frost action, expansion and contraction strains due to temperature changes. Of course, we all know that wood lasts longer if kept coated with paint or varnish. Because of wood's porosity and permeability, it is possible to impregnate every portion of wood with a preservative so that not only the surface, but the entire piece is resistant to decay and, what is in many cases more important, to insect infestation. Although surface coatings wear and weather and need continuous attention that they may be effective, a good preservative treatment will protect wood for scores of years with the very minimum of attention.

The greatest use of treated wood is in constructions requiring long life with a minimum of maintenance costs. The preservative used for treating the wood for these and similar uses must have long, effective life, be inexpensive, and easy of application. Appearance is often of minor importance. Where appearance is a consideration, these uses, being of a specialized nature and having a high fabrication cost, can stand a higher charge for the preservative. These higher type applications are becoming of increasing importance to the wood preserver's business.

For some time coal-tar creosote has been the main preservative used for treating wood to protect it from decay. It is effective, permanent, inexpensive, easily applied and plentiful, and when used according to the recommendations of the American Wood Preservers' Association, provides perhaps the most reliable and inexpensive preservative. Creosote is at a disadvantage because of its color, odor, and the difficulty of successfully painting over creosoted wood. However, the use of a prime coat of aluminum bronze in a Bakelite varnish may be a remedy for the latter difficulty. Where creosote is undesirable, as on interior building trim, wood to be painted, or which will come in contact with the persons of passers-by, salt preservatives, of which zinc chloride is the most important, are commonly used.

Quantities of Wood Treated

The quantities of these materials used in 1930 as given by R. K. Helphenstine[3], Jr. were, roughly, 214 million gallons of creosote materials and close to 14 million pounds of zinc chloride. In contrast, only 1,770,925 pounds of other salts and only 202,891 gallons of other liquids were used as preservatives. Coal-tar creosote applications and zinc chloride treatments constitute almost 98 per cent. of the preservative treatments. The figure for creosote includes both domestic and imported coal-tar distillate creosote, water-gas-tar creosote, creosote-coal-tar solutions, and similar preparations. Creosote and zinc chloride are the standard preservatives for the treatment of cross-ties, switch-ties, piles, poles, wood-blocks, cross-arms, and construction timbers. Wood for these uses constitutes the bulk of the material treated, which in 1930 was 342 million cubic feet. The remainder of the wood treated, consisting of lumber, mine ties and timber, fence posts, pipe staves, car material, shingles, etc., amounted to 10¼ million cubic feet. It is felt that 1930 figures are more representative of the trend in wood preserving than are those for 1931, which are markedly smaller. A similar general reduction in activity in the wood preserving industry can be observed in the figures for 1921. In this case, however, the figures for the following year again rose to levels corresponding to those preceding the depression.

The creosote used has increased at a rapid rate till the last few years, when consumption has remained steady or even fallen slightly. Zinc chloride consumption has declined slowly during the last ten years. The trends seem to show that saturation has been

reached in the market for treated ties and poles. Further expansion must be made in new fields, since practically all main line ties and poles are now treated. With the exception of a small amount of new line construction, replacements will soon constitute the main bulk of the business.

The Field for Chemicals

The chemical manufacturer must, therefore, look to the new fields of wood preservation, such as lumber and timber work, for outlets for his products. What can be his hopes in these fields? Although many have been tried, no salt preservative in use can be said to be entirely satisfactory. A satisfactory treatment must, first of all, be effective as a preservative over considerable periods of time. The preservatives used, or the treated wood, must not be corrosive to hardware, tools, or treating equipment. Failure in this respect rules against the use of several otherwise good preservative materials. Safety demands that the preservative shall not be unduly poisonous or harmful. It is, for example, fairly dangerous to treat wood with mercuric chloride because of its high toxicity to men and animals. The cost of treatment must be low and the materials plentiful enough so that considerable use will not unduly raise their price. It would be advantageous if the treatment could be made by a non-pressure open tank. In certain cases, it may also be necessary for the treated wood to have low electrical conductivity; for example, cross arms for transmission line poles.

With these points in mind, some of the common and more successful preservatives, other than creosote, will be considered.

From the point of view of quantity used, zinc chloride is the most important salt used for the preservation of wood. In 1929, about 20 million pounds; 1930, 14 million pounds; and in 1931, 10 million pounds were used for wood preservation. Zinc chloride is marketed either in solid (fused) form in air tight drums, or as concentrated solutions containing about 50 per cent. of the salt in drums or tank cars. The solution used for treating should contain two to five per cent. of the dry salt. The specifications on which zinc chloride is generally purchased for wood preservation is that of the American Wood Preservers' Association, which says "The zinc chloride shall be acid free and shall contain not more than 0.1 per cent. iron. Fused or solid zinc chloride shall contain at least 94 per cent. chloride of zinc. Concentrated zinc chloride solution shall contain at least 50 per cent. chloride of zinc.[4]" Zinc chloride has a fairly long record of service and one can determine fairly accurately what to expect of it.[5] In common with most salt treatments, it has the disadvantage of being soluble in water and of being fairly easily leached out of the wood. It is not suited, therefore, for the treatment of wood which is to be used under wet or very damp conditions. It is also fairly corrosive to iron, making it customary to figure a higher depreciation for zinc chloride treating plants than for creosoting plants, even though the equipment used is practically the same. Zinc chloride is somewhat hygroscopic. When used incorrectly or in too high a concentration in the treating solution, zinc chloride can weaken wood considerably, due to its action on cellulose.[6] Zinc chloride is almost always applied by a pressure process. When used according to the recommendations of the American Wood Preservers' Association[7], zinc chloride is a good wood preservative.

Because of its high toxicity, mercuric chloride is a very effective wood preservative under dry, or not too moist, conditions.[8] Its high toxicity, however, militates against its more general uses. It is also very corrosive to, and reactive with, iron and many other metals. Free mercury is deposited and the iron taken into solution. Mercuric chloride is commercially applicable, therefore, only by steeping or dipping processes, using vats made of wood, concrete, etc. In this country its use is confined to a relatively few non-pressure treating plants located mainly in the New England States.

Copper Sulfate

Copper sulfate has enjoyed a considerable popularity as a wood preservative in France, especially in the Boucherie process[9]. This preservative treatment is applied to unseasoned timber, preferably as soon after the log is felled as possible. A copping arrangement is applied to one end of the log and the preservative solution forced in under hydrostatic pressure of about 15 pounds to the square inch. The preservative solution, as it enters the wood, forces the sap out ahead of it. Copper sulfate is quite effective as a preservative and is relatively inexpensive. An advantage is that, since it stains the wood into which it has penetrated a deep green color, it serves as its own indicator of the thoroughness of its penetration. It is, however, quite corrosive to iron. Its solutions, when in contact with iron, deposit metallic copper and take iron into solution. Wood treated with copper sulfate should not be used in wet or very damp localities, as the preservative is easily leached out of the wood.

Sodium fluoride has been reported to be an excellent wood preservative[10]. It has been used with considerable success in Europe, and in considerable quantities; so far it has been used but little in the United States. It forms the basis of several proprietary wood preservatives of good reputation which contain, along with the sodium fluoride, small proportions of other compounds designed to increase the toxicity of the mixture towards certain organisms, to decrease the corrosiveness of the salts, and to color the preservative so that the depth of penetration into the wood can be easily determined. Dinitro phenols and dinitro cresols are frequently constituents of these mixtures. Dr. F. Moll says: "The general scheme

for compositions of this kind is about 80-90 per cent. sodium fluoride, 10-15 per cent. dinitro compounds, and 0-5 per cent. special admixtures; and the amount of dry salt used for one cubic foot of timber is about 0.2-0.25 lb." The greatest development of these preservatives has been in Europe, especially through the efforts of Malenkovic and Wolman. Several of these salt mixtures are now being produced in this country. The names of a few of these proprietary preservatives and their approximate compositions are[11]:

Wolman Salts—of which there are several varieties: Triolith—a mixture consisting mainly of sodium fluoride, to which certain bichromates and nitrated phenols have been added. This salt is recommended by the manufacturers for the treatment of mine timbers, ties, and lumber. Minolith—Triolith, to which certain chemicals such as borax and rock salt have been added to make the treated timber more fire resistant. Tanalith—Triolith, to which an arsenic salt has been added to make the treated wood more resistant to insect attack.

Wolman has also recently brought out a salt mixture which he names Tanalith U, for which the claim is made, that once introduced into the wood, it is removed by leaching only with great difficulty. It is thus claimed that the one great disadvantage of salt preservatives is overcome in this mixture.

Basilite—said to consist of 88 per cent. sodium fluoride and 12 per cent. dinitro phenol anilide. Sullite—a Swedish preparation composed mainly of sodium flouride to which other toxic agents have been added. Protex—an American preparation composed mainly of sodium fluoride.

The patent literature contains many references to preservatives of this type. Concerning the value of these preparations, the United States Department of Agriculture says, "There are, on the market, several proprietary preservatives composed chiefly of sodium fluoride and containing small amounts of other materials. Their high percentages of sodium fluoride insure good resistance to decay, regardless of whether the added materials increase their effectiveness."

Salts of Low Solubility

The chief drawback of salt treatments is their impermanence under wet or very damp conditions, and many attempts have been made to impregnate wood with solutions containing materials capable of reacting with each other to form insoluble, or but slightly soluble, preservatives in the wood. The attack on this problem has followed two lines—to discover a treatment using two or more solutions consecutively, or a treatment with a single solution containing the reacting materials which form the slightly soluble compound only after evaporation of most of the water during the seasoning or drying of the wood. Notable successes have been claimed by workers in both fields. The Wellhous process was an early attempt along this line. The wood was first treated by a pressure process with a solution of zinc chloride and glue[12]. This treatment was followed by an injection into the wood of a ½ per cent. solution of tannic acid. The tannic acid and glue combined to form an insoluble seal for the zinc chloride. In this connection, it must be noted that the formation of too insoluble a compound is not desired, as it would not be possible to obtain a sufficient concentration of the preservative in solution to kill the destructive organism if the preservative salt were too insoluble. This may happen, for example, with fluorine salts when very insoluble metallic salts are formed.

The Zinc-Meta-Arsenite, (Z-M-A) treatment, developed by Curtin and Howe[13] several years ago, is a single solution treatment in which a very slightly soluble compound is claimed to be formed during the drying of the treated wood. The treating solution consists of a solution of zinc acetate and arsenious acid in water containing some free acetic acid. It is claimed that, although the zinc-meta-arsenite which forms is only very slightly soluble in water, it is soluble in the acid secretions of the wood-destroying organisms. Although the process is too new for any long service records the treatment has aroused considerable interest. Curtin also describes experiments with copper-arsenic compounds[14], which, while promising preservatives, are very corrosive to iron in the solution form in which they are injected into the wood.

Highly Toxic Arsenicals

Marine borers are exceedingly destructive and while more prevalent in some regions, especially in warmer ones, they are of economic importance wherever wood is used in salt sea water. So far, the most effective method of discouraging their activity has been to impregnate the wood heavily and thoroughly with coal-tar creosote but the creosote leaches out of the outer layers of the wood and protection is so decreased that borers may obtain a fast hold.[15] Attack then having been started, even creosote offers no secure protection. The U. S. Chemical Warfare Service, with the National Research Council, undertook a study of this problem. Their experiments showed that by adding certain highly toxic, slightly soluble compounds to creosote, or even to fuel oil, wood impregnated with the mixture was afforded a definite protection.[16] Borers would not cross from an infected, untreated piece of wood to an adjacent piece treated with the toxic mixture, while they would cross over to a piece impregnated with creosote alone. A number of compounds were tested, chief among the more effective ones being chlor vinyl arsenious oxide (a derivative of Lewisite), phenyl-arsenious oxide, diphenylchlorarsene (DA), diphenylamine-chlorarsene (DM), diphenylarsenious oxide (DA oxide), diphenylamine-arsenious oxide (DM oxide), phenyl dichlorarsene, and copper carbonate. All except the last are war

gases or derivatives of war gases. One and one-half per cent. solutions of diphenylchlorarsene (DA) in fuel oil, and diphenylamine-chlorarsene (DM) in creosote, and copper carbonate in ammoniacle solution, were selected for long time exposure tests as offering the greatest chances of commercial success. These materials will not involve any change in commercial methods of impregnation, nor will they offer any increased hazard during impregnation or in handling the treated wood. Some commercial activity in this field is already noted, and more may certainly be expected if the service records are favorable.

Organic compounds other than creosote seem to have been overlooked until recently in the search for wood preservatives. Both crude and refined naphthalene have had a limited use, probably more often incidentally to the use of a creosote fraction rich in naphthalene. Due to its high volatility at ordinary temperatures, there is some doubt as to the permanence of a naphthalene impregnation but the point is debatable. The hydroxy derivative of naphthalene, beta-naphthol, seems to have a number of advantages over naphthalene itself[17]. It is more toxic, not as volatile, and does not tend to discolor. Impregnating solutions of beta-naphthol may be prepared using colorless, volatile organic solvents. The patent literature, in recent years, has contained many references to the use of organic mercury compounds[18]. Their relatively high price and present unavailability will preclude any wide adoption of them for some time to come. The use of organic arsenicals in creosote has already been mentioned. Phenolic and nitro phenolic compounds of high toxicity have also been suggested.

Fireproofing

With the increased entry of wood preserving into the treatment of lumber and building materials, it will be natural to find an increased interest in the fireproofing, considering that the processes and equipment required are so similar. Losses by fire run into staggering sums, due quite largely to the fact that wood, our commonest building material, is so easily combustible. The logical way to reduce losses by fire is, of course, fire prevention.

Wood fireproofing dates back to the ancient Greeks and Romans, who attempted to make their battle galleys and siege towers fireproof so that their enemies' fire balls and Greek fire would not ignite them. They steeped wood in solutions of salt or alum. Interest was again shown in fireproofing during the eighteenth and nineteenth centuries, in connection with theatres, warships, and army supplies.

Gay-Lussac, in 1821[19], carried out systematic investigations from which he concluded that ammonium phosphate was the most suitable material. His results were substantiated by work done at Columbia University in 1921, one hundred years later. Wood fireproofing received considerable stimulus in 1895 when the Navy specified that wood to be used in warship construction should be fireproofed, but in 1902, because of difficulties encountered in the use of the fireproofed wood, its use was discontinued. New York City specified in its revised building code that the interior window frames, trim, flooring, etc., in buildings over twelve stories high, had to be fireproofed. This again stimulated the fireproofing industry greatly, but brought with it the promotion of many worthless processes. The great need of the industry was then, and is still, standards of performance and a simple, reliable test of the effectiveness of a treatment, so that the purchaser may be assured that he is getting the protection for which he paid.

Fireproofing Salts

Practically all of the more common chemical compounds have at some time or other been tried, recommended, or patented as materials for rendering wood resistant to fire. Only a few have a real value, and those form the foundation for all of the really effective treatments. Recent tests made at the Forest Products Laboratory[20], showed that certain chemicals had no important effect in retarding fire even when present in large amounts; that others have a moderate fire-retarding effect when present in large quantities; while still others had a distinct effect in retarding fire when present in small amounts and a marked effect when present in large amounts. Those chemicals tested which had no important fireproofing action included sodium chloride, barium chloride, sodium sulfate, oxalic acid, calcium acetate, and potassium titanium oxalate. Those having a moderate effect if used in large quantities included sodium silicate, potassium iodide, sodium carbonate, sodium bicarbonate, strontium chloride, sodium thio-sulfate, magnesium sulfate, sodium ammonium phosphate, sodium stannate, sodium tungstate, nickel sulfate, and barium hydroxide. The most effective compounds included sodium arsenate, sodium arsenite, borax, ammonium chloride, magnesium chloride, diammonium phosphate, monoammonium phosphate, aluminum chloride, zinc chloride, calcium chloride, boric acid, ammonium bromide, ammonium sulfate, chromium chloride, and manganese chloride.

These groupings are, of course, arbitrary. Some of the chemicals are on or near the border line between groups. Practical considerations rule out of commercial use most chemicals listed as effective. The arsenic salts might give off poisonous fumes; the chlorides of aluminum, magnesium, chromium, manganese, and calcium all increase the moisture content of the treated wood to a marked degree; some of the compounds are extremely corrosive to metals; others must be used in fairly large quantities; and others are expensive. Six chemicals were considered most promising. These were ammonium chloride, dibasic ammonium phosphate, monobasic ammonium phosphate, ammonium sulfate, borax, and zinc chloride;

and of these, intensive studies showed that diammonium phosphate was the most effective, with monoammonium phosphate a close second.

The protective action is not exactly understood, and is obviously not the same for all salts. Suggested mechanisms include the liberation of large quantities of flame-smothering gases such as ammonia or steam, the absorption of heat through endothermal decompositions, the absorption of heat from the flame by polyatomic gases (again ammonia or steam) of large heat capacity, or by the formation of glassy, non-flammable coatings, such as orthophosphoric acid, on the surface of the wood. A single compound may be effective by a combination of several of the above effects.

The fireproofing salts, in solution, are injected into the wood by pressure impregnation processes, much like those used for injecting salt preservatives into wood but with the difference that, since the grade of lumber given fireproofing treatments is generally high, more attention is paid to subsequent drying and seasoning. Improper drying will tend to cause uneven deposition of the salts in the wood, the deposition of salts on the surface of the wood, and general degrading of the lumber due to warping and checking. Complete penetration of ordinary lumber is generally not difficult. Heavy construction timbers may offer difficulties to complete penetration, but here, if a penetration of several inches has been secured, a fire resistant case will have been formed which should effectively protect the timber. Treatment should, in this case, be made after framing. It is practically impossible to make wood completely fireproof—that is, to make it completely non-combustible. It is possible, however, to treat wood so that it will not in itself maintain combustion, and will glow or flame only when exposed to an externally supported flame or source of heat. This is the practical goal of effective "fireproofing" of wood.

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Wood Preservatives

A study of the value of the higher chlorinated phenols as antiseptics and as wood preservatives has been made by W. Iwanowski and J. S. Turske ("Przemysl Chemiczny," October, 1933). By the chlorination of phenol under definite conditions the workers obtained a product consisting almost entirely of trichlorphenol in the form, after recrystallization, of needle-shaped crystals. The process as applied to cresol was less satisfactory, much more tarry matter being obtained, and it being essential to separate the trichlorcresol by steam distillation. The yield was in no case higher than 20 per cent. of the theoretical. The trichlorphenol as obtained by the authors is of 98.9 per cent. purity, contains a small amount of the dichlor derivative, and its melting-point is 62.5° C. against that of the pure product of 67° C. to 68° C. The sodium salt of trichlorphenol was prepared by melting this latter under water at 70° C. and adding sodium carbonate in small quantities at a time. The amount of carbonate employed was about 20 per cent. in excess of the theoretical. Towards the end of the reaction the neutralization can be accelerated by the addition of caustic soda instead of sodium carbonate. On completion of the reaction, the solution is separated from the tar, concentrated, and crystallized.

It was found that the aniline compound of trichlorphenol increased very markedly the bactericidal efficiency of cracked mineral oil, while the sodium salt of the compound when used alone was a very efficient fungicide. The sodium salt of trichlorphenol was also found a very effective wood impregnating and preserving agent, possessing the further advantage of not being readily leached out. Hard waters containing calcium and magnesium do not form a precipitate with the above sodium compound, but solutions of this latter should not come into contact with iron. Dichlorphenol and trichlorcresol are both weaker antiseptics than trichlorphenol. The use of trichlorphenol compounds for wood impregnation is protected by English Patent 296,332, in addition to allied Polish, Belgian, Italian, French, and German patents. The materials are manufactured and sold in Poland under the trade name "Lalit".—*Chemical Trade Journal.*

Chemicals and the Second Five-Year Plan

An almost maidenly modesty of what has been done combined with a boasting optimism for what will be done characterizes this resume of the Russian chemical industry which we have abstracted from the official review made by the Moscow Nardony Bank.

DURING the last five years the chemical industry has been radically reconstructed similarly to other Soviet industries, this reconstruction having been carried out on a large scale and with remarkable success. The growth of the industry's output (chemical rectification of oil excluded) may be gauged from the following figures: 1,300 million roubles (approx.) in 1932 as against 400 million roubles in 1926-27. Here it must also be taken into consideration that the real growth of output due to capital investments in the last few years will only be noticeable after opening the new factories which are at present under construction. The capital invested during 1932 in the chemical industry will exceed 600 million roubles.

In spite of such a big step forward the chemical industry of the U.S.S.R. has not yet won the position to which it is entitled and which is dictated by the requirements of the various industries of the country. Its bringing up to date is one of the great problems of the second Five-Year Plan.

Chemical Fertilizers

The potassium fertilizers, and especially the nitrogenous ones, were not produced in pre-war Russia. The production of artificial fertilizers was limited to the manufacturing of a negligible quantity of superphosphates which, in 1913, was only 55,000 tons.

The production of ammonia has been started in a special plant of the Chernorechensky Chemical Combine, and recently the first sections of similar plants have been put into operation by the Bereznikov and Bobrikov Combines. The process universally adopted consists of producing synthetic ammonia through coke conversion, and this method will be applied in the U.S.S.R. during the second Five-Year Plan. The program includes the erection of several plants in districts where coke is abundant, all of them being considerably larger than the first Soviet undertakings, the "Bobriky" and the "Berezniky."

If the great natural resources of the U.S.S.R. are to be fully utilized in an efficient way, with rational distribution of labor and output, it will be necessary not to limit the manufacture of ammonia through coke conversion only, but also to exploit peat and other varieties of raw material, as, for example, the methane, which is found in Dagestan.

The second Five-Year Plan also includes production of ammonia by means of water electrolysis. In the world chemical industry this method represents some 15 per cent. of the various processes used for the purpose. The exploitation of exhaust gases of coke batteries will also play an important part in the production of ammonia during the next five years.

The constructive work in the U.S.S.R. will bring that country level (1937) with modern Germany, which is at present leading the world, but even then, in spite of developments on such a large scale, five years will not be sufficient to solve entirely all the problems of the Soviet chemical industry.

The anticipated increase in ammonia production, and the resulting rise in the output of nitrogenous fertilizers, should ensure by 1938 100 per cent. fertilization of land under technical and special plants only, and the fertilization itself will not be perfect. As far as vegetables are concerned, only 40 to 50 per cent. will be fertilized, whereas grains will be left over until the third Five-Year Plan.

The extremely rich resources of potassium discovered in the Solikamsk district made possible considerable construction work carried out during the first Five-Year Plan. Now, a number of large mines will be completed, with an output of from 2½ to 3 million tons each, and the production of several valuable chemicals will be developed during the next five years. The output of potassium salts is estimated to reach the high figure of 12 million tons, and 250 million roubles will be invested in their production. The conditions for the mining of these are very satisfactory, as rich layers of salts are to be found at a depth of only 300 feet (German mines are 600 feet deep), digging and boring operations being thus con-

siderably simplified; they will be completed in two or two-and-a-half years.

Phosphorus mines are to be found in many parts of the Soviet territory and they were in exploitation before the war (the Podolsky, Egorievsky and Viatka districts). Extensive prospecting has disclosed very rich resources in the Khibinisk and Akhtubinsk regions and has made possible new constructive and productive work to be carried out in those localities. The technical side of these undertakings has made a big step forward. Artificial enrichment of phosphorus ores, and the manufacture of double and treble superphosphates, make up fully for the considerable expense of transporting phosphatic ores and finished products. The sublimation of phosphorus ores has, therefore, to be widely developed within the near future so as to lower the costs of production and raise the standard of production.

Crusher lifting Pyrite at a Baku sulfuric acid works.

The output of soluble phosphoric fertilizers will have to reach, by the end of the second Five-Year Plan, 1,500,000 tons. Such an increase will give the U.S.S.R. first place among the phosphoric fertilizer producers of the world, i.e., ahead of France and the U. S. A.

The manufacture of fertilizers requires a large quantity of sulfuric acid. The estimates show that in 1937 some 3,200,000 to 3,500,000 tons will be needed, i.e., approximately two-thirds of the total amount of sulfuric acid produced in the U.S.S.R. To ensure an adequate supply in such quantities, new plants will have to be erected and existing ones undergo extensive alterations. If these alterations are carried out in a sound and rational manner, and the efficiency of present equipment increased, the output of the existing plants can be raised, at a small cost, by some 60 per cent. The construction of new factories will include extensions to present ones and the erection of entirely new plants in the Urals, Central Asia and other districts.

The program of the second Five-Year Plan also includes the development of other fundamental branches of the chemical industry, the one deserving particular attention being that which is concerned with the production of calcined soda. This product is being manufactured in 1932 at the rate of approximately 300,000 tons per annum, but this figure will have to be raised five times so as to provide an adequate supply to such rapidly growing industries as the glass, aluminum and soap industries, as well as for the needs of the home and export markets.

The by-products of coal distillation and special treatments of coal-tar are other problems of the Soviet chemical industry. A great deal has already been done in that direction in the U.S.S.R. during the last few years, but the work is far yet from having been concluded.

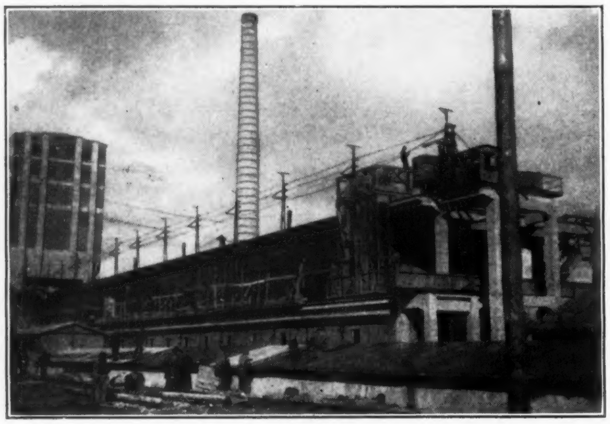
The speedy development of the dyestuff industry, the growth of aviation and the necessity to increase the defensive powers of the country, call for an extensive chemical utilization of coal. The output of synthetic dyes (in connection with the growth of the textile industry, for example) has to be increased from 250 to 300 per cent. Together with this increase, the production of high-grade dyes (indigo and others) must be raised at the expense of the less valuable ones, and the specific weight of sulfuric dyes must be brought down.

Alongside these problems there is also the problem of adopting gas for lighting and heating purposes. The exploitation of exhaust gases of coke furnaces is, therefore, extremely important. In this respect metallurgists have made a big step forward, but the chemical industry is still far behind and much will have to be done in that direction during the second Five-Year Plan. Closely linked with this problem is the underground gas generation by means of burning coal in the mine itself.

With regard to the question of employing gas for lighting and heating purposes, suitable localities for erecting new gas plants will have to be chosen, depending upon the disposition of factories supplying the necessary raw material and towns consuming the gas.

One of the less developed, but at the same time most promising branches of the chemical industry, is the production of various plastic compounds. These are used for the manufacture of many articles of technical and home use, as, for example, certain machine parts, a considerable number of motor-car

components (battery boxes, magneto parts, etc.), household utensils, pedestals for electric lamps, cigarette boxes and cases, and even wallpaper. Since the war, the production of plastic compounds in Europe has been greatly augmented, but in the U.S.S.R. it is still in its infancy. During the last few years, however, the output has been raised to some 10,000 tons per annum. This is, of course, insufficient to cope with the ever-increasing demand, and the second Five-Year Plan includes a further develop-



A coke oven at the Alchevski Metallurgical Works.

ment of this industry up to a yearly output of 250,000 tons of plastic compounds, which will replace about a million tons of highly unprofitable ferrous and non-ferrous metals.

The development of the Soviet chemical industry as a whole is facilitated by the possession of extremely rich natural resources of raw materials. In that respect, the branch working in conjunction with the timber industry is in the most privileged position. The production of resin, camphor, and turpentine will proceed very rapidly. This applies most particularly to resin, which represents one of the fundamental ingredients in soap manufacture. It is estimated that the output of soap in 1937 will reach two million tons, which means that hundreds of thousands of tons of resin will be required.

The products of distillation are also very important. Without even mentioning charcoal, which is so indispensable for the metallurgical developments in the Ural district, the manufacture of acetic acid, methylated spirit and various other products will be greatly increased. Along with the manufacture of natural by-products of charcoal distillation, Soviet chemists must also give their attention to the production of synthetic materials on a wide, but rational scale. The manufacture of artificial silk must also speedily develop during the next five years.

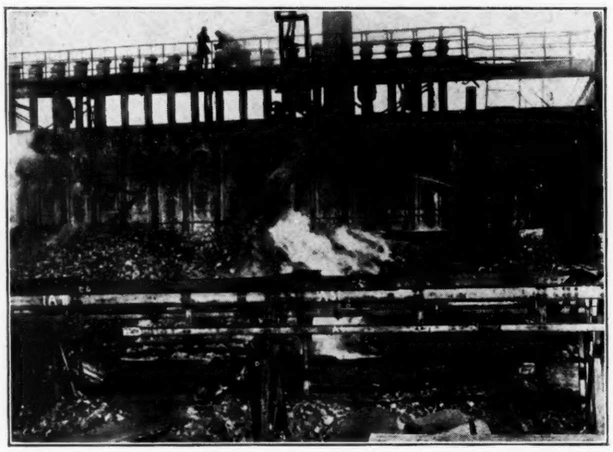
One of the most unprofitable branches of the Soviet chemical industry is at present the pharmaceutical one. The population of the country is supplied with medicines at the low rate of 40 kopeks per person per annum. Such a small supply is, of course, totally inadequate and will have to be considerably increased during the second Five-Year Plan, not only to satisfy the general requirements, but also for purely prophylactic purposes.

One of the most important factors of success in the further development of the chemical industry is the rational co-operation with it of other industries of the U.S.S.R. In the manufacture of sulfuric acid, for instance, it is essential to co-operate with non-ferrous metal plants, and the coal chemistry is closely linked with coke plants.

Success would be out of reach unless due attention is given to scientific research work; the history of the German chemical industry easily proves the correctness of this statement. Research work is particularly needed in connection with the production of synthetic chemicals, the development of which depends entirely upon results obtained in laboratory work. Therefore, this matter will be fully dealt with during the second Five-Year Plan.

The exploitation of lignites, peat and slates is also of considerable interest and will result in the production of synthetic liquid fuels and in the use of gases for manufacturing ammonial and other synthetic products.

The carrying out of the second Five-Year program will bring the U.S.S.R. level with other European countries. In the production of potassium it will be equal to Germany; as far as nitrogen is concerned—only slightly behind the Germans, and in the production of phosphorus it will lead the world. With regard to the output of sulfuric acid and coke, the



There are forty coke ovens in the Frunze Konstantinov Metallurgical Works.

U.S.S.R. will be next to the U. S. A.; the production of synthetic dyes should equal that of France and Great Britain, remaining, however, behind Germany and the U. S. A.; the manufacture of plastic compounds, artificial yarns, etc., will also be widely developed.

All this program puts a heavy responsibility upon the U.S.S.R. manufacturers of chemical equipment and machinery, who have, therefore, to treble their activities. This is, perhaps, the most important factor of success.

The Costs of Tank Car Service

By Harry M. Mabey
Traffic Manager, Mathieson Alkali Works, Inc.

BASED on the fact that the railroads are expected to furnish the cars necessary to transport the freight which they carry, an arrangement has been developed whereby the railroads pay the owners of tank cars, as a partial remuneration, an allowance per mile for the movement of the cars, loaded and empty. Since 1920, this allowance has been at the rate of 1½c per mile.

The railroads recently announced that they were going to make a reduction in this tank car mileage allowance of ¼c per mile, so that the returns to the car owners would be but 1¼c per mile.

In view of the fact that the tank cars owned and operated by the chemical industry, not including cars used by the chemical industry leased from concerns who make it their business to rent tank cars, ranges from thirty-two million to forty-six million miles per year, therefore, this threatened reduction of ¼c per mile would mean, if it became effective, an increase to the chemical industry on the cost of owning its own tank cars ranging from one hundred thousand to one hundred thirty-five thousand dollars per year.

Any reduction in the existing mileage allowance rate of 1½ cents for privately owned tank cars, would do an unwarranted injustice to the chemical industry. We are certain that this 1½ cent rate has never and does not now reimburse them as the owners of these tank cars for even their out-of-pocket cost of maintenance and depreciation. We further assert that the development of the requisite types of tank cars for the handling of specific products of the chemical industries has made possible the transportation by railroad of entirely new materials, and that our industry, bearing, as it now does, the major part of the cost of building and operating these cars, should not now be asked to increase these costs, which is what this proposal would do.

Chemical industry, because of the nature of its products, has had to go beyond the idea that a tank car was simply a metal container on trucks and devise specific types of tanks to haul individual products which, otherwise, could not be handled at all. I am referring to special steel; special linings; i. e., rubber, nickel, glass, etc.; special extra strengths to withstand pressures. Necessarily, these cars resulted in construction costs per car far in excess of anything that had before prevailed in the ordinary tank car classes.

The membership of the Manufacturing Chemists' Association, Compressed Gas Manufacturers' Association, and the Chlorine Institute, the Alkali Traffic Association, and the National Fertilizer Association own and operate 7,763 cars. Of these about 5,727 are the regular riveted tank type—but some 2,036, or 26% of the fleet, are the specially designed cars which I have described. Assuming an average cost of $1,750 for regular tank cars, this means an investment of $10,022,250 in 5,727 cars, but in the cars designed for specific liquid commodities, even if we use a low average cost of $4,500 each, we have an investment of $10,458,000, for but 2,036 out of 7,763 cars—more for 26% of the fleet than for the other 74%.

The cost today of a 103 type—the ordinary tank car—is from $1,850 to $1,900 f. o. b. manufacturer's plant. I am naming today's costs—ignoring the fact that few cars, if any, in the existing fleet were purchased at today's lower costs. Compare these tank car costs with present selling prices of the various types of cars in the large fleet of cars maintained by the chemical industry. The lowest cost car I find today is a compressed gas car at $3,750 ranging to $4,870 for this liquefied gas—chlorine. Next—rubber lined acid cars—$3,950-$4,670; butane—$4,000—not a particularly heavy car; ammonia—$5,200 to $7,800; propane—$5,600-$7,000. Most of these are heavy, welded pressure cars, and it is certain that they cost the industry more than these prices indicate.

Most chemicals manufactured by one branch of the chemical industry are a raw material used by some other branch. As a result, the consuming plant is always thinking in terms of avoiding all transportation, either by producing its own raw materials, or by locating next-door to a plant which does make that material. Low delivered costs which will include all transportation, are always a controlling factor. In certain quarters at least, the true value, to the railroads, of the privately owned tank car, as a producer of revenue and tonnage, has not been fully appreciated. It is a fact, which cannot be disputed, that without the tank car this type of tonnage would not move by railroad in anywhere near its present volume. Insofar as the chemical industry is concerned, this is a movement of raw materials, and in no other vehicle of transportation could the greater part of this movement be justified. There will be much talk again of the empty movement of privately owned tank cars, as though this condition, relatively, was not just as prevalent with the carriers on their equipment. Such talk as this ignores the fact that the carriers are compensated for this movement in their assessment of freight charges on tank car traffic.

Method of Determining Freight Charges

The carriers collect revenue to the limit of the capacity of every tank car. In other words, the minimum weight is the capacity of the car, and freight charges are invariably collected on this basis. Making the absurd assumption that this tonnage could be shipped in ordinary box cars in whatever retail package might be necessary, the minimum weight would not be in any case the capacity of the car. The rule in the case of shipments made in carrier's equipment is that the minimum weight must be largely controlled by the reasonable and average demands of commercial practice and necessity. When carrier owned equipment is used, it is apparent that no inducement exists for the shipper to load the cars to capacity. He never has to pay freight based upon capacity. The exact contrary is the case where privately owned equipment is used. The owner of the car has a tremendous investment in cars; it is to his monetary advantage to see that each one of his cars is loaded to capacity, and further, to see that the efficiency of operation is as near perfect as possible. The more he loads into his car, and the more the loaded movement of his car, the less are his operating losses on his private equipment.

Based first upon the factors many times advocated by private car owners as properly reflecting their costs of ownership and operation, we have included insurance, taxes, replacements, repairs, depreciation (calculated as prescribed by the I. C. C. in Ex Parte 104-Part 5, i. e.,) "the amount (if any) charged off during the fiscal year for depreciation," interest on capital investment, overhead, and clerical costs. Each one of these items would be incurred by the railroads if they, themselves, were to furnish such equipment.

The sum of these items, in a weighted average, proves our members' cost to have been 5.62 cents per mile in 1932. The comparable cost in 1931 was 6.03 cents per mile, and in 1930, 6.41 cents per mile operated.

In order to prove our contention that we never have and do not now receive a return equal to the bare cost of operation—we have computed—for the same total of cars, a cost which embraces only insurance, taxes, replacements by plant and by carriers, and, repairs by plant and by carriers. This includes no charges for other items—i. e., depreciation, interest on capital investment, overhead, or, clerical costs. The resulting bare running cost of operation and upkeep for the year 1932 was 2.17 cents per mile. The comparable figure for 1931 was 2.36 cents per mile, and for 1930, was 2.30 cents per mile.

These costs are not advanced as representing the returns to which we, as car owners, are entitled, or which we would accept, voluntarily. We have always insisted that we are entitled to a greater allowance than the 1½ cents that we now receive. The railroads originated this threat to reduce the present allowance, and we are frankly and fully putting these costs on the record.

International Superphosphate Trade

Total world superphosphate production for 1931 at 10,986,397 tons, compared with 15,584,662 tons, the revised figure for 1930, shows a reduction of 4,598,265 tons, or say 29.5 per cent. The smaller reduction was in Africa, about 4,500 tons or slightly over 14 per cent., and the greatest reduction actually in Europe (about 2,416,500 tons) and in percentage in Asia (Japan) 47 per cent. Europe's percentage reduction was below the average at 26.5 per cent., while America was in excess of the average, 39 per cent. The tonnage of phosphoric acid represented by the superphosphate production is estimated at 1,815,140 tons, as compared with 2,571,950 tons, the estimated phosphoric acid content of the 1930 production.

It is evident that the interchange trade suffered a very material reduction in 1931 as compared with 1930 when the total quantity exported was returned at 1,185,555 tons; the reduction in 1931 was, therefore, 189,067 tons, or 16 per cent. Interchange trade, however, did not decline *pro rata* with the consumption; in other words, the exporting countries maintained more than their *pro rata* share of the trade. Consumption of superphosphate was substantially in excess of production, the relative totals being 11,633,231 tons in 1931, and 14,709,151 in 1930, a reduction in 1931 of 3,075,920 tons in consumption as compared with a fall in production of 4,598,264 tons. Stocks in manufacturers' hands were therefore reduced by 646,833 tons during the year, whereas during 1930 stocks were increased by 875,511 tons. It is of interest to observe that taking the two years 1930 and 1931 together, production and consumption practically balanced each other, thus:—

	Production (*tons*)	*Consumption* (*tons*)
1930	15,584,662	14,790,151
1931	10,986,397	11,633,231
Total	26,571,059	26,342,382

In commenting upon the 1930 statistics, it is pointed out that the deliveries of phosphate rock had obviously been in excess of the consumption and that it was accordingly to be expected that the 1931 deliveries would show a more marked falling off than would the superphosphate production.

Agricultural Readjustment

By Horace Bowker
President, American Agricultural Chemical Co.

THERE can be no possible doubt that agriculture is the greatest sufferer from the depression. Unemployment in agriculture is negligible; out of 10,500,000 farm owners, tenants and farm laborers only 17 per cent. are unemployed, as compared to 45 per cent. in mining and manufacturing industries, 38 per cent. in transportation, and 35 per cent. in the domestic and personal services; but it is also true that farmers for the most part have a roof over their heads and some food in the cellar.

These are mere superficialities, for we are faced by the inescapable fact that the disproportionately low prices now being received by the farmer have not only created an acute problem in carrying the fixed charges of mortgage interest and taxes, but have placed the farmer at an economic disadvantage that demands emergency relief at the earliest possible moment.

In the face of greatly curtailed consumption both in this country and abroad, the total area of crops harvested last year was one per cent. larger and the composite yield 3.6 per cent. higher than in 1931, although fractionally below the 10-year average. In contrast, it should be noted that 1932 industrial production was approximately 50 per cent. below the ten-year average. This is wholly understandable; the farmer reasons that with low prices he must grow as much as possible; he has to pay interest and taxes on his land anyway, so he keeps on producing. That is why, in a period of declining prices, the farmer is at a distinct and growing disadvantage.

It is small comfort to point out that this has always been true in time of depression; or that while farm prices fall first and farthest when prices are declining, they are usually the first to show substantial recovery when the price trend is definitely reversed. This latter fact has lent color to the theory that marked improvement in agricultural prices has shown the way out of past depressions, when in reality the prices of agricultural commodities merely describe a wider arc than industrial commodities.

In respect of farm products with exportable surpluses, the swing is even wider, because these crops are exposed to the full force of world conditions. Thus, grain prices are fully one-third and cotton almost 20 per cent. lower, relatively, than the average of all groups of farm commodities.

Here the explanation is to be found in steadily declining exports. From a war-stimulated peak of 533,000,000 bushels of cereals in 1921-22, exports declined to 210,000,000 bushels in 1925-26; from that time on, surpluses began to accumulate, not only in grain but in cotton, tobacco and other farm products. The weight of these surpluses almost doubled between 1925 and 1928, in both wheat and cotton. This was an underlying cause of the commodity price decline that got under way in 1927 and persisted through 1932.

It is difficult to define the extent to which this condition is due to overproduction or to underconsumption; but in respect of the latter we know that so far as our domestic markets are concerned, national income declined from 85 billions in 1929 to less than 40 billions in 1932, and that even though the consumer's dollar buys more today than in 1929, the spendable income of the public has been radically curtailed by the 20 billions absorbed in taxes and interest charges, which still are at or about 1929 levels.

Thus, leading wholesalers tell me that demand for farm products is off from 30 to 40 per cent; and the truth of the matter is that the consumer, too, has had to take up a few notches in his belt. The domestic farm market has been definitely contracted by the unremitting pressure of taxes and other fixed charges, as well as by the decline in income. So far as export markets are concerned, the utter confusion growing out of the situation in respect of war debts and related problems of trade derangement has created a condition where prices could be cut almost to the vanishing point without adequate response.

This is the background against which we must consider a program of farm relief; a background which no amount of sympathy for the present plight of the farmer can change.

In all frankness, my conviction is that we could drain the financial resources of the nation, either direct by bounty to the farmer or through the adoption of inflationary measures, tempting as superficial examination indicates such measures to be,—and still we would have failed to improve the relative position of the farmer; because that difference is due to inherent maladjustments which must be removed and cannot be affected by palliative measures.

Statistics are utterly inadequate to portray the distress of a large part of our agricultural population; and, while the same might be said with respect to our 12 million unemployed, it is profoundly important that the nation should, without further delay, face the bitter facts about the farm-mortgage situation and take immediate action to relieve it. In 1929, interest absorbed only six per cent. of the average farmer's gross income, while in 1932 it absorbed 12 per cent. In other words, the interest burden doubled. In addition, the decline in land values has tended to wipe out the property equity of many farmers. It is in the highest degree unsound to allow this condition to run its course to the bitter end.

The Domestic Allotment Plan

I realize only too well that industry has lost its farm market; indeed, the shrinkage in the farm market is almost twice as large as the shrinkage in the nation's foreign trade. The decline in U. S. domestic exports from 1929 to 1932 is estimated at 3½ billion dollars, while the farm-market shrinkage in the same period amounts to almost seven billion. It is wholly understandable, under such circumstances as these, that emergency measures designed to raise farm prices are engaging the sympathetic consideration of the nation. A case in point is the Domestic Allotment Plan, or as it is technically known, "A Bill to Aid Agriculture and Relieve the Existing National Emergency," now before Congress.

This plan has been widely debated; its dual objective is to put more money in the farmer's pocket quickly and at the same time to effect a decrease in production of the crops to be aided. These objectives cannot fail to meet with general approval. But the method employed is open to the gravest criticism.

This emergency measure aims to remedy a chronic economic problem of agriculture,—the problem of excess productive capacity,—made more acute by the steady decline in export trade. This problem has been in the making for twenty-five years; its solution is impossible without soundly-grounded, comprehensive plans, requiring a period of years for sound development and practical application, and attempts to cure by a stroke of the pen a problem which has been developing for a generation. That problem should not be allowed to drift any longer; but we may as well face the fact that in attempting to solve it in last-minute desperation we may instead of making things better, make them a whole lot worse.

Sound reorganization of our agriculture will take time; if immediate steps are taken we can look for constructive results over a period of years. Meanwhile, there are farmers—based on first-hand observation, I estimate about one in every three—who have made agriculture as profitable as any other business. To be sure they aren't making money today; but neither is anybody else. The point is that over a 10-year period, which is the only way to judge any business, there are some two million farmers who derive a splendid standard of living out of the soil.

Broadly, the problem of balancing agricultural and industrial incomes is a problem of balancing efficiency. It has been competently estimated that industry has outstripped agriculture in productive efficiency in the ratio of more than two to one. During the past fifteen years American farms have been mechanized to a considerable extent. Yet, as previously noted, the unit cost of producing most crops has remained about stationary or has shown only a slight downward tendency. Low crop yields per man or per acre have tended to counterbalance production economies obtained by the use of machinery.

As a mine is depleted of ore that can be refined at a profit, production costs rise. Improved processes may offset the declining quality of the ore, but in the end the mine is abandoned as uneconomical. Growing crops take plant foods—principally nitrogen, phosphorus and potash—from the soil. As the soil is "mined" of these plant foods, crop yields necessarily decline. That is the basis upon which Malthus predicted a hungry future for the human race. Science has found no way to replenish paying ore in a mine, but it has provided in manufactured plant foods or fertilizers a means of restoring the fertility of the soil.

There are some six million farmers in the United States, and even in normal times less than a third of them use enough fertilizer to sustain crop output at a rate which approximates a theoretical balance of efficiency with industrial output. It is significant that this figure coincides with the number of successful farmers previously mentioned. The remainder are engaged in soil-mining, and the resulting decline in yield per man or per acre means a widening gap between their income and that of industry.

Soil mining is increasing at an alarming rate; the deficit in fertilizer consumption in the last three years more than equals the total consumption of a normal year, which in itself is utterly inadequate to maintain the productivity of the soil.

A determining factor in what it costs to produce each pound of cotton, bushel of wheat, or barrel of potatoes is the number of pounds, bushels, or barrels obtained from each acre. As the yield is increased, the unit cost comes down. Lowered unit costs increase net income just as directly as higher prices. And increased per acre yields depend primarily upon an adequate supply of plantfood, in conjunction with sound farm-management practices.

Farm purchasing power is defined not by price alone but by net income, which is the spread between gross income and crop production cost; this margin or spread can be increased just as certainly by reducing costs as by increasing prices.

For emergency relief, I have urged immediate action to stop further mortgage foreclosures; at the same time taking a firm hold not only of our own fiscal problems but of those affecting world trade. This is the short-road view. Looking down the long-road, I have urged immediate development of a comprehensive program for the reorganization of agriculture.

I believe that if we forego the temptation to lift ourselves by our bootstraps with inflationary and price-fixing plans, we shall see slow but steady progress toward recovery.

John Francis Queeny: 1859-1933

John Francis Queeny is dead and another outstanding figure of the generation of our great chemical individualists has passed out of our industrial arena.

From early boyhood, for the destruction of his father's property in the Chicago fire sent him out to make his own way in the world at an age when today most boys are just beginning to wonder what college they want to attend, till only two months before his death, Mr. Queeny was an active, prominent figure in the pharmaceutical and chemical industries. Unaided, without wealth or influence to help him start, single-handed, through the sheer force of his character, the charm of his personality, and his wide and intimate knowledge of chemical making and selling, he built his monument, the Monsanto Chemical Works.

Few American chemical manufacturers were better equipped by experience, for Mr. Queeny began in the office, went to the shipping room, became later buyer for one of the great wholesale drug houses, and turning from purchasing to selling made an outstanding record first, as a great personal salesman, and later as an efficient sales executive. When he embarked in business for himself he was forty-two years old; his judgment had been tested in responsible posts with several well established houses; he had first-hand knowledge of the trade and many friends.

The beginning was very modest. A little plant that was only a glorified shack with a cookstove, and a working capital of $1500. But the tiny factory was in charge of a rare chemical genius, the young Swiss, Louis Veillon, who was shortly joined by two fellow-countrymen Gaston du Bois and Jules Bebie. This trio developed the products and processes of a line that beginning with saccharine came in time to embrace vanillin, caffeine, phenolpthalein, chloral hydrate, and the salicylates. And the financing and the marketing were in the hands of John Queeny.

Every forward step was a battle. Working capital was needed, and back in the early years of the century to establish a coal-tar medicinal chemical industry in competition with the great German firms was pretty generally considered a foolhardy venture. Research, plant expansions, sales efforts all had to be cut carefully according to the cloth, and only hard work and efficient, economical management kept the enterprise alive and growing. During this trying period Mr. Queeny demonstrated his rare capabilities as the father of an industrial infant.

Each new product drew the fire of destructive competition from the European competitors who had no intention of allowing this lusty American baby to grow to manhood. As a sample of the price war that Mr. Queeny fought through, chloral hydrate, before Monsanto began manufacturing, sold for 90c a pound. Mr. Queeny entered the market at 60c, and the imported material was brought down to 18c. When Monsanto withdrew, the price was jacked back to 50c. With variations, similar campaigns were fought over every new Monsanto product. The bitterness of those battles surpassed anything that we know even in these dark days of distressed selling and falling prices.

Our American chemical industry owes a vast debt to John Queeny and his peers of that earlier generation. He, and Dow, and Nichols, the Schoelkopfs, the elder Merz and Hendricks, Kalbfleisch, and their contemporaries and competitors, were real heroes of American business. The good fights they fought to establish the chemical industry in our country were truly a war of independence and our debt to them is akin to the debt that the nation owes to Washington, to Hamilton, to Jefferson and Ben Franklin.

John Queeny embodied the characteristics of our pioneer industrialists. He was a great personal executive. He was a leader not a generalissimo; a strong, decisive executive; a vigorous competitor; a warm-hearted friend. Had it not been for his high courage and consuming enthusiasms he would never have been able to have laid so firmly the foundations of the great company he has left behind. Men of his ilk are all but impossible in this era of vast, merged interests. His passing has snapped a link with the colorful and illustrious youth of the American chemical industry.

New Products and Processes

New Rubber Curing Process

It is claimed that by the addition of "Ratnasara" to latex prior to coagulation with acid, the rubber prepared by the usual coagulation method may be dried at atmospheric temperature, without smoking, and the dried rubber will be suited for market requirements. The following information has been made public by its inventor:

"Ratnasara" is a dark brown solution, neutral in character, odorless and gives on evaporation a dark brown odorless residue. It does not give a precipitate with gelatin and does not produce Fehlings solution. The ash contains no radicals, such as manganese which might be harmful to rubber. The main use of this solution is that by mixing it in small quantities with latex at time of coagulation the necessity for smoking is eliminated for the purpose of sheet preservation. The rubber sheets prepared with "Ratnasara" are for all practical purposes similar to smoked rubber sheets. Other incidental advantages of using this solution are:—

a. reduction in F.O.B. costs by saving of
   1. labor
   2. firewood
   3. insurance premium on smoke houses.

The proportion of solution to be used (one fluid ounce per gallon of field latex) amounts to approximately two parts solution to 100 parts rubber by weight. The solution contains four parts solids per 100 parts by weight of solution. Thus the proportion of solids to rubber does not exceed 0.08 parts per 100 in the finished sheet.

New Rayon Size

Rayon fabrics that have been sized and held in storage preparatory to being processed for dyeing or printing are apt to show oxidation, particularly if the sizing solution contained linseed oil.

A new process reduces this susceptibility to oxidation by partly sulfonating the linseed oil used in the preparation of the sizing with other non-drying oils. It is stated that drying oil sizes so prepared assist creeping hard twist yarns when sized.

The method of making this size is to thoroughly mix 100 parts of olive oil and 20 parts of sulfuric acid of 66 deg. Be. at a temperature of 10 deg. C., the mixture being then added to a similar one, but with linseed oil substituted for the olive oil. The whole mixture is then embodied with 100 parts of linseed oil and 20 parts of sulfuric acid of 66 deg. Be., but for this stage the temperature is gradually raised to 35 deg. or 40 deg. C. The resulting sulfonated product is then washed with water and neutralized with dilute alkali, in which state it may be used either alone or in combination with other media. Two specimen sizes for rayon yarn are constituted as follows:—

Size 1. Sulfonated oil (as above), 40 parts; Glue, 6 parts; Gum Arabic, 4 parts; water, 50 parts.

Size 2. Sulfonated oil (as above), 30 parts; Wax, 2 parts; Soap, 7 parts; Glue, 6 parts; Water, 55 parts.

Delustering Rayon

A method for producing designs on acetate rayon fabrics without printing thereon with color consists in principle of contrasting delustered with non-delustered areas. The original methods for accomplishing this were based on the fact that certain substances, which possess the power of causing swelling or dissolving of the acetate rayon filament, are also to accelerate or retard, as the case may be, the delustering power of steam or hot water. The new method consists in printing on the acetate rayon fabric substances which accelerate the delustering action, plus a swelling agent, subsequently passing the fabric through a bath, which is maintained just above the boiling point for a short, definite period. The printing composition is then washed out with cold water. The new process can also be improved by the use of dilute saline or alkaline solutions instead of pure water. The salts retard the delustering action of the boiling water, but the retarding action is only fully exerted on the parts which are not covered by the printing paste, because the swelling agent cannot be easily penetrated by the salts. The result is that the covered areas are brought into contact with boiling water only, and the action is immediate due to the presence of the accelerator. Swelling agents and aliphatic organic solvents, such as the alcohols, ethers, ketones and the like, may be used as accelerating substances. Aromatic organic compounds, such as the amines, aldehydes or phenols and the heterocyclic substances, such as pyridine and quinolin may also be employed.

Dust-Binder on Unpaved Roads

Sulfite cellulose waste liquor is being used to some extent in Sweden for dust-binding on unpaved roads. In order to reduce transportation costs, the liquor is sometimes evaporated to dryness at the pulp mill and applied in powder form on the moistened road surface, where it is dissolved by the rain and penetrates the surface layer. The evaporation of the waste liquor must be carried out at a temperature not exceeding 150°, because at higher temperatures considerable amounts of water-insoluble matter are formed. Thus a liquor subjected to 220° for three hours showed a content of 62 per cent. insoluble matter, whereas by heating for five hours to 150° the content of insoluble matter came to only eight per cent. in the same liquor. A simple furnace for the evaporation of sulfite waste liquor by means of hot smoke gases has also been designed and patented.

A New Leather

Mellon Institute of Industrial Research announces the successful completion of the most outstanding scientific development in the leather and shoe fields since vici was created in the 1880's. At a certain point in the vici method, a marked departure is taken from the usual treatment by impregnating the skin with an entirely new combination of materials. In this way the fibers are supported and lubricated, inhibiting their breaking down under wear—a main cause of some leathers losing their shape when in use. Shoes fashioned from it require no dressing, and a buffer and friction brush bring out a rich finish of any desired brilliance. Having no hard surface, the skins can be worked without the usual danger of factory damage, simplifying handling throughout the process of manufacture.

Probably the most important feature to the consumer is the permanence of its finish. The heat of the foot gradually but constantly encourages the impregnating materials to the surface, thus maintaining a lubricant on the grain which requires only slight rubbing to preserve the desired polished effect. The impregnation also adds to the water-resisting quality of the leather. This method does away with the crocking common to leathers finished with hard surface dressings that powder and fly with wear. All colors are said to be more permanent because the color is constantly revitalized by the material with which the skin is impregnated. Other advantages are that it is more durable, practically scuff-proof, and is soft and pliable to an unusual degree, yet retains the advantage of kid in permitting the foot to breathe.

Chemical Facts and Figures

Reciprocal Agreements

Already signs are not lacking that the March 1933 edition of the "era of good feeling" is about to end in sharp disagreement over the old bugaboo—the tariff. Country, solidly lined up behind the President in his banking and economy legislative program, is likely to witness, shortly, severe dissatisfaction on the part of several industries with the proposed Hull plan for tariff pacts. That the chemical industry will be in the thick of a fight is a foregone conclusion.

Harry L. Derby, chairman of the tariff committee of the National Association of Manufacturers, fired the first shot at the recent A. C. S. Meeting, calling to the industry's attention the disproportionate government expenditures contributed by the industry (See A. C. S. Meeting report, Association News Section). He urged that the American chemical structure should be better protected by tariffs against foreign competition resulting from depreciated currencies.

On April 3 the President, in his message to Congress on farm mortgage refinancing asked for authority to initiate reciprocal tariff agreements "to break through trade barriers and establish foreign markets for farms and industrial products."

At the White House it was said that informal negotiations had already been opened by the State Department with several countries and, that the administration is ready to move in a definite direction as soon as Congress authorizes the President to act.

Depreciated Currencies

President Roosevelt and Secretary Hull are not turning a deaf ear to demands that something be done to remedy the situation caused by dear dollars and cheap foreign moneys. Fluctuating currencies, disparities in dollar exchange, low price of silver affecting purchasing power of 800,000,000 people, high tariffs, quotas, agreements, and other economic subjects are under discussion here and abroad between high U. S. and British officials. Efforts are being made to speed up plans for the Monetary and Economic Conference.*

Question of meeting depreciated currencies was pushed to the background by the sudden collapse in financial confidence late in February. However, with the emergency legislation now out of the way, Congress will pick up where it left off last session. There are really two schools of thought as to how the vexing question should be met. The administration, in brief, hopes that agreements with a large number of countries, by bringing a general lowering of tariffs, will bring stabilization to world currencies so that the dollar will not be at a disadvantage. Republicans view tariff reciprocal agreements by the president with suspicion, and prefer to protect American industry with rates sufficiently high as to bar imported materials from cutting into the domestic market with ruinous prices.

In an exclusive interview to Chemical Markets, Mr. Derby, considered as the industry's spokesman on matters of tariff policy, stated that the plan as outlined in Washington dispatches would put into one man's hands the fate of scores of American industries. "On what basis," asked Mr. Derby, "do the proponents of the reciprocal agreement plan expect to choose which industry or industries are to be offered up as sacrifices on the altar of free trade."

Derby—"Why Change?"

Mr. Derby strenuously opposes placing such unlimited and dangerous power in the hands of the President. "While we have at the moment in the White House a man of high integrity, a man in whom the people have complete confidence in his fairness and disinterestedness, what assurances have we that this will always be so?" "Why," continued Mr. Derby, "change to a new untried revolutionary policy when we already have ample facilities in the present Tariff Commission and the flexible clauses of the present tariff measure to correct any real unfairness in the rate structure."

Cyanamid & Chemical's president has little patience with theorists, self-styled economists, and others who insist that tariff rates are too high. "I have asked a large number of such people just what rates they would substitute, what rates they would suggest as fair and equitable in the face of present day uncertainties caused by depreciated currencies, foreign wages, foreign basic material costs, etc. In every case they are unable to give specific answers but resort to generalities." Mr. Derby believes that no question facing chemical industry today is of anything like the importance as is the matter of the tariff.

It is quite certain that resolutions petitioning Congress to call public hearings on any legislation which would commit this country to a reciprocal tariff policy, or grant to President Roosevelt the authority necessary to alter the tariff rates on specified products in bargainings with other countries for tariff concessions, will be forwarded to Washington, as soon as any definite steps are taken by the administration. It is more than likely that the chemical industry, one of the chief sufferers from intense competition directed from countries with greatly depreciated currencies, viewing foreign business as distinctly secondary to holding control of the domestic market in the hands of domestic producers, will assume leadership in such opposition, and will "hawk-eye" Washington and reciprocal agreements with great care.

THE MONTH REVIEWED

Mar.

- 6 Union Solvents loses appeal. (347)
- 9 Senator Norris introduces Muscle Shoals Bill. (341)
- 14 Cyanamid earns 14 cents a share. (355)
- 16 Chemical Section, N. Y. Board of Trade hears Rainey. (338)
- 17 Chilean nitrate problem lands in State Dept. (339)
- 19 John F. Queeny dies. (335)
- 27 Eighty-fifth A. C. S. Meeting opens in Washington. (338)
- 27 N. J. Zinc wins suit against Singmaster. (340)
- 27 Synthetic Plastics sued. (340)

April

- 3 President Roosevelt's plan for "reciprocal agreements" meets with opposition. (337)

"Gas" With a Kick

Alcohol producers' (Mid-west), in plants anticipation of federal action on law requiring two per cent. alcohol (from grain) in gasoline motor fuels, are reported behives of activity. Proponents of original 10 per cent. blend are said to have abandoned earlier suggestion in favor of two per cent. measures. Should federal legislation fail to pass (it is conceded that little opposition will be met) principal U. S. "grainery" (Illinois, Iowa, Indiana) will, in all probability, put a "kick" into "gas" state-consumed. These three states use 1,750,000,000 gallons of "gas" divided as follows:—Illinois, 950,000,000; Iowa, 357,000,000; and Indiana, 443,000,000. Proposed two per cent. plan would require 35,000,000 gallons of alcohol.

Estimated total productive capacity is now 200,000,000 to 300,000,000 gallons. In recent years production has run between 50,000,000 and 100,000,000 gallons. In 1932 approximately 53,000,000 were

*President has now invited 14 countries to send representatives to Washington conference to be held late in April.

produced. U. S. I.'s Peoria plant (estimated capacity 5-6,000,000 gallons annually) is expected to start operations with corn April 15. New Orleans plant with productive capacity of 15,000,000 gallons can be changed to corn (brought down the Mississippi by barge), and Commercial Solvents is reported already in production of ethyl alcohol from corn mash. Plant capacity is estimated at 30-35,000,000 gallons annually. American Commercial Alcohol's Peoria plant (capacity 4,000,000 gallons) is already supplying alcohol for 10 per cent. gasoline motor fuels for experimental work by Farm Bureau chemists.

Two per cent. alcoholized motor fuel will present no technical difficulties. No radical carburetor changes are required; blending agents would be unnecessary; two per cent. anhydrous alcohol content would not absorb any appreciable water from the atmosphere; two per cent. alcohol content would only slightly raise the cost to Mr. Motorist—about 1c a gallon say supporters of this farm relief measure.*

The "Kingfish" Disappoints

Thoroughly imbued with "State Fair" spirit, reveling in anticipation of Oscar's cuisine and a promised "one-ring circus, featuring Huey Long, assisted by Cartoonist Milt Gross, 875 chemical, drug and allied "Who's Who" filed into the spacious main ballroom of the new Waldorf-Astoria to attend the Eighth Annual Dinner of the Drug, Chemical and Allied Sections, N. Y. Board of Trade. But "Kingfish" pleading "pains in his head" placed white-haired, deep voiced Henry T. Rainey, new speaker of the House, on the "Congressional", and retired early to his Washington suite. Inured to disappointments by after-dinner speakers, the crowd welcomed Substitute Rainey with applause as he registered point after point. "There will be no more irritating and oppressive taxes" . . . . "We will balance the budget without additional taxes" . . . . "What we need more than anything else is a return of confidence, and we are getting it." Cheers greeted the Speaker's mention of the economy bill, "an exploit without precedent in this country or any other in the world."

Francis (Frank) J. McDonough, section chairman, introduced Toastmaster Charles L. Huisking as the man in whose mind "the idea for these get-to-gether dinners originated." Other speakers included Dr. Hendrick Wilhelm Van Loon, lecturer, humorist and historian, Percy C. Magnus, former section head and now president of the Board, and Cartoonist and Humorist Milt Gross.

Ammonia gas is introduced into steam boilers at Merseburg Ammonia plant in Germany to prevent corrosion.

*See pages 307-309 this issue for a survey of the prospects of this proposed relief measure.

Association News

Cyanamid's Harry L. Derby with "The Relation of Chemistry to the State;" du Pont's Dr. Charles M. A. Stine with "The Relation of Chemical to Other Industry;" Princeton's Hugh S. Taylor with "Chemistry—Its Interrelations With Other Sciences;" and General Motors' Charles F. Kettering with "The Relation of Chemistry to the Individual" "headlined" the opening of 85th A. C. S. Meeting at Washington March 27.

Cyanamid & Chemical's well-known president sketched a broad picture of chemical industry's contribution to the state. Pointing to five year payment of more than $1,000,000,000 (years 1926-1930 inclusive) in taxes to federal, state and local governments, speaker reported chemical industry paid a disproportionate share of governmental expenditures and should be better protected by tariffs against foreign competition resulting from depreciated currency. Mr. Derby showed how chemical industry has helped to increase world's gold supply first, by the cyanidation and, later, by the flotation processes. "Popular conception of "Technocracy" was vigorously attacked. "Increase in employment in chemical industries has been twice the rate of the growth of population, reflecting the creation of new industries by chemistry in recent years."

Du Pont's chemical director, eminently fitted to discuss "creative chemistry," traced smashing of natural monopolies, restating an old fundamental law of economics, "If a new product is as well adapted as an old product to the purpose to be served and cheaper, or if the new product, which may be developed, fulfills requirements not heretofore met by existing products, it must find its place in industry." Nor did he need to go out of his own company's history for numerous examples to prove it.

Charles F. Kettering advocated concerted action by the technical and scientific organizations of the country to solve economic problems. "We must apply the same mental attention to economic subjects as we do to our technical processes. We must discover where we are, how we got here, and where we would like to go. Then I am certain we will go." He strongly stressed desirability of chemists imparting to the average individual a better understanding of the value of chemistry in daily life.

Single Survivor Honored

Eighty-three year old Dr. Charles Edward Monroe, only surviving charter member of the A. C. S., honorary chairman of the meeting, was overwhelmed when he arose to speak at dinner given in his honor, but proudly displayed diamond membership badge of the society he helped to found 57 years ago and pocketed a new bright gold coin of the U. S. Mint whose operation he once supervised, gifts from his admirers. Special feature of the week was the observance of the 200th anniversary of the birth of Priestley with a collection of exhibits and a special session of the Division of History of Chemistry.

Special meeting featured Nobel prize winner—Dr. Irving Langmuir. Following his address "Surface Chemistry," audience listened to a concert of the National Symphony Orchestra. Other outstanding American technologists on the program: E. B. Alvord, director, new products division, Grasselli; Dr. Gustavus J. Esselen, vice-president, Skinner, Sherman, and Esselen. Boston; chemical radical and author of "Chemistry Triumphant" (most widely discussed chemical book of the year) Dr. William J. Hale, Dow director of organic chemical research; Dr. Gustav Egloff, Universal Oil Products chief chemist; Philadelphia Quartz's silicate authority extraordinary—Dr. James G. Vail; and Dr. R. E. Rose, du Pont director of laboratories and research. From leading technical schools: Dean Frank C. Whitmore, Penn State; winner

COMING EVENTS

American Society of Biological Chemists, Cincinnati, April 10-12.

National Petroleum Association, Hotel Cleveland, April 20-21.

The Electrochemical Society, Montreal, May 11-13.

Tanners Council, Seasonal Leather Opening, Hotel Astor, N. Y. City, May 8-9; Spring meeting, White Sulphur Springs, May 12-13.

Natural Gasolene Association of America Hotel Tulsa, May 15-17.

American Petroleum Institute, Midyear Meeting, Hotel Mayo, Tulsa, May 17-19.

American Leather Chemists' Association, Hotel Claridge, Atlantic City, June 7-9.

National Fertilizer Association convention, White Sulphur Springs, Greenbrier, June 19-21.

American Society for Testing Materials, Chicago, Hotel Stevens, June 26-30.

American Electroplaters' Society, Chicago, Congress Hotel, June 27-30.

American Association of Textile Chemists and Colorists, Annual Meeting, Chicago, September.

American Chemical Society, Chicago, Week of Sept. 11.

National Petroleum Association, Annual Meeting, Hotel Traymore, Atlantic City, Sept. 20-22.

American Association Natural Gas Dept., Chicago, Sept. 25.

National Metal Congress and Exposition, October 2-6.

Federation of Paint & Varnish Prod. Clubs, Edgewater Beach Hotel, Chicago, Oct. 26.

National Paint, Oil & Varnish Association, Edgewater Beach Hotel, Chicago, Oct. 27-30.

Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 4-9.

American Society of Mechanical Engineers, N. Y. City, Dec. 4-9.

Fifth National Organic Chemistry Symposium, Cornell, Dec. 28-30.

Local-N. Y. City*

April 14—Joint Meeting form technical Societies, May 5, A. I. C.

***Chemist Club unless otherwise specified.**

of the 1932 Chandler and Nichols awards, Harvard's James Bryant Conant; Prof. Wilder D. Bancroft; Prof. Marston T. Bogart and others.

Sherman, A. I. C. Medalist

A. I. C. medal, presented annually for outstanding service to chemistry in America, has been awarded this year to Dr. H. C. Sherman, head of the department of chemistry at Columbia. Award is made in recognition of Dr. Sherman's food researches, and his services to the profession through the training of chemists.

Dr. Sherman has been for nine years Mitchell Professor of Chemistry at Columbia, and has been head of the department since 1919. He is a past president of the Society of Biological Chemists.

Other past medalists include Dr. Charles H. Herty, Andrew W. Mellon and Richard B. Mellon, honored for establishing Mellon Institute for Industrial Research; late George Eastman, who made fine organic chemicals available to the chemists of the country; and Mr. and Mrs. Francis P. Garvan, who established the Chemical Foundation. Medal will be presented to Dr. Sherman at annual meeting of the A. I. C., to be held in N. Y. City in May.

Salesmen Plan

Chemical Salesmens Association's new executive committee met March 13 with President B. J. Gogarty, Rossville, presiding, to discuss 1933 committee appointments. Association plans establishment of an employment bureau. Attending: "Cy" Galliher, Columbia Alkali; Louis Neuberg, Warner; Frank Byrne, Monsanto; William Barry and Charles Kelly, Mallickcrodt; Ira Vandewater, Greeff; Gustav Bayer, Merck; Alvarez, Grasselli, Dorland, MacNair-Dorland.

Chicago Drug and Chemical Association elected E. L. Drach, of Abbott Laboratories, president, March 30.

American Association of Textile Chemists and Colorists, N. Y. Section, listened to Dr. P. H. Stott, du Pont, speak on "The Dyeing of Cotton-Wool, Rayon-Wool, and Silk-Wool Mixtures," and A. A. Dessow of Interstate Chemical on "The Moth-Friend or Foe," at March meeting held at Elm Golf Club, March 24.

Souvenir volume of the 25th annual meeting of the A. I. Ch. E. contains "Typical Records of Research in Chemical Engineering Industries." Companies included: Aluminum Co. of America, Atlantic Refining, Bakelite, Brown Co., Corning Glass, Dow, du Pont, Eastman Kodak, G. E., Hercules, International Nickel, Goodrich, Monsanto, National Lead, N. J. Zinc, Standard of N. J., U. S. I., Vacuum Oil.

New Valuable Service

Drug, chemical and allied Trades Section, N. Y. Board of Trade is about to inaugurate new service to members. Monthly bulletins will advise of bills introduced in Washington and Albany of interest to the industry in general. Chairman McDonough has appointed S. W. Fraser chairman of committee on legislation. Assisting will be S. B. Penick; Gustave Bayer, Merck; C. Leith Speiden; Pfizer's A. A. Teeter; Monsanto's "Vic" Williams; Chas. A. Prickitt, Upjohn Co.; A. Bakst, Bakst Bros.; Ray Schlotterer, section secretary, will act in similar capacity for committee.

"Aliphatic Sulfonates" was the subject of talk by National Oil Products' technical director, Ralph Wechsler, March 21 to Lehigh Valley A. C. S. Section.

Chemical Club of Philadelphia listened March 13 to Capt. Joseph Chandler, chemical director, Hahnemann Medical College, talk on "Chemical Warfare with Relation to Modern Chemical Industry."

Treasurer William L. Sweet, Rumford Chemical, and Walter C. Teagle, Standard of N. J. president, are on the program of the 21st Annual Meeting, U. S. Chamber of Commerce, May 2-5 at Washington.

Foreign

President Roosevelt's Administration faced its first serious Latin American problem March 17, when American investors in Chilean nitrate bonds asked U. S. Ambassador William S. Culbertson to protest against Government's recent action in suspending payments on 60 peso per ton ($3.60) export tax on nitrates.

Proceeds from the tax were used to meet service payments on the bonds. Government wants revenue to balance budget.

Within a few hours Foreign Minister Cruchaga delivered notes to Ambassadors of the U. S. and Great Britain in reply. Notes contend Chilean Government is justified in canceling guaranty, which hitherto has been retained for service on international loan of March, 1931. Bonds issued under this guaranty, it is asserted, which were taken up by the Guggenheims, National City and Anglo-South American Banking Corp. in New York and by the Rothschilds and others in London, will be supported later by a revised guaranty perfectly acceptable to bondholders, which may consist of anticipated payment for nitrate sold.

Charge is made that Cosach failed to deliver to Chilean Government in cash certain annual sums called for by its charter, but paid instead with second class bonds of the two issues. Notes add that adoption of the old-time export tax is expected to bring important revenues to the government.

On the same day Chilean export duties on nitrate and iodine, suspended since July 10, 1930, were reimposed, former at a rate of 10.14 pesos per metric quintal and latter at six pesos per net kilo.

Later Santiago press dispatches reporting on the nitrate situation indicate a sharp division has arisen in the ranks of the liquidating committee consisting of Aureliano Burr, President Alessandri's representative, Jorge Matte, Supreme Court representative, and Horace Graham, representing Cosach.

Notes that the Chilean Government handed March 17 to Ambassadors of the U. S. and Britain leave no doubt that Chile will insist upon removal of the tax, which is to be replaced by the ordinary export tax established in 1897 and kept in force until Cosach was formed.

That tax measure gives the government right to hold all revenues on nitrate exports and leaves foreign bondholders without an established guaranty.

Mr. Graham sums up protest against government's action thus:

"Situation between Chilean Government and Cosach must be liquidated. Whether it is deemed that the contract was made with a de facto company or with a corporation legally formed, its provisions bind the government, and until such time as said contract is rescinded by mutual agreement the government has no right to collect the export tax. I move that the liquidating company resolve to protest against the government measure."

On April 3 Foreign Minister Miguel Cruchaga Tocornal informed U. S. Ambassador that bond holders of Cosach who object to Chile's bond guarantee withdrawal "can appeal to Chilean courts."

Senor Cruchaga takes position that no grounds exist for diplomatic intervention in the case and, after a long review of the legal aspect of the creation and pending dissolution of the nitrate monopoly, expresses his belief that a resort to the courts is the proper method of pressing any further investigation of the matter.

Gelozone, new vegetable colloid and gelatine, produced by Whiffen & Sons, Ltd., exhibited at the British Industries Fair, is finding application with reported superiority in a number of industries formerly using animal gelatine.

Dr. Alfred Ree, 70, former president of Society of Dyers and Colourists (British), a former vice-president, Society of Chemical Industry, and first chairman British Association of Chemists, died Feb. 28 at his home in Manchester, England.

R. S. McLaughlin, G. M. (of Canada) president, is now a director of Int. Nickel.

British Hydrogenation

Through hydrogenation of coal, says the Fuel Research Board, (British) a greater proportion of motor spirit and fuel oil could be obtained from the coal than by any other known means. "I. C. I." it reports, have developed process originally suggested by Dr. Bergius, and have worked a plant dealing with 10 to 15 tons of coal a day.

"Available experience shows that the process is perfectly feasible to work on a large scale and that an appreciable proportion of the motor spirit used in this country could be made from coal. It is clear, however, that the cost of production from coal would be considerably above the present import prices for petroleum products."

Dr. J. T. Dunn, D.Sc., has been elected president, Society of Chemical Industry (British) for year 1933-34. Dr. Dunn is sole owner of J. and H. A. Pattinson, of Newcastle.

Offer of acquisition has been made to August Wegelin, Germany's second largest lampblack producer, and now in difficulties, by Gold-und-Silbersscheide-Anstalt, Frankfort.

German exports of organic acids, with few exceptions, declined in 1932 as may be seen from the table below. Imports of certain organic acids are also shown.

	—Metric quintals—	
Exports	*1931*	*1932*
Oxalic acid	40,944	34,862
Acetic acid	48,727	48,446
Lactic acid and lactates	18,435	15,309
Tartaric acid	37,859	30,337
Citric acid	167	185
Salicylic acid, salicylates	3,513	4,470
Formic acid, formates	53,462	50,723
Benzoic acid, sodium benzoate	4,251	3,475
Imports		
Tartaric acid	1,007	607
Citric acid	6,180	7,700
Benzoic acid, sodium benzoate	993	941

Herty Statement

President Roosevelt will find machinery in readiness for development of a self-liquidating reforestation program‡ in 11 States comprising Southern pine belt, Dr. Charles Herty, promised in an interview at Atlanta, March 23.

"With their 181,500,000 acres of forests and cut-over lands," declared Dr. Herty, "a million men could be set to work in these States at once clearing underbrush, plowing fire strips and resetting pine seedlings. Vast new market for pine wood which will be opened up as a result of our recent improvements in the methods of manufacturing paper and paper products means that in the near future a forest will pay better dividends than a farm.*"

Georgia Forestry Association invites all interested to attend its annual meeting at the De Soto Hotel, Savannah, Georgia, May 1-3, to discuss technical, economic and industrial aspects of a white paper industry in the Southeast. Georgia has financed a semi-commercial project to study the manufacture of sulfite pulp, mechanical pulp and white papers such as newsprint, book paper, sulfite specialties, etc. from Southern pines. This work will be reported by W. G. MacNaughton, former Tappi secretary, who is directing research work at Savannah with Dr. C. H. Herty. Exports on industrial resources and economic conditions will discuss favorable and unfavorable aspects of the Southeast as a new paper manufacturing center. Opportunity will be given to inspect laboratory and to see it in full operation. Tuesday, May 2, will be devoted to a motor trip to reforestation projects, turpentine woods operations and other points of interest.

In the Courts

Synthetic Plastics (Cyanamid's "Beetle") is defendent in suit brought jointly by Ellis-Foster and Unyte in Federal Court at Wilmington. Complaint served March 27 alleges infringement of a number of patents in the urea-formaldehyde resin field. Patents in question are said to cover urea-formaldehyde type of resin invented by Pollak and Ripper of Vienna and assigned to Pollpas, Ltd., Great Britain. Unyte is headed by former Kuttroff, Pickardt partner, William P. Pickhardt. Company was formed in February, 1930, acquiring at that time patent rights and processes to urea resins from the I. G., Ellis-Foster, and Carleton Ellis individually.

Almost simultaneously with the filing of this suit came an announcement from Synthetic Plastics that it had granted license under its patent rights to Bakelite for the field of urea resin molding compositions.

Said the announcement: "Included in the patents of Synthetic Plastics are those covering pioneer inventions of Drs. Fritz Pollak and Kurt Ripper, of Vienna, acquired from Pollopas Company of England, and those covering technical developments of the British Cyanides of England, as well as the subsequent developments of the laboratories of Cyanamid."

N. J. Zinc Upheld

N. J. Zinc won in decision† of Federal Court Judge Francis C. Caffey March 27 in N. Y. City in suit against James A. Singmaster and Tubize Chatillon to establish ownership of a patent on the ground that the basic idea of the patent had been conceived while the inventor was in its employ under a contract stipulating that all patentable ideas developed by employees became the property of the employer. This patent covered use of certain pigments in rayon filaments. Case which occupied several weeks was bitterly fought and attracted wide interest because of some of its novel features. Court benches were loaded down with expensive technical talent. Zinc company alleged in part that Singmaster while head its technical department, charged with the responsibility of finding new uses for zinc oxide, entertained the idea of strengthening rayon fibres with zinc oxide but did not make any attempt to obtain patents and did not inform his superiors of the possibilities. Further that shortly after his resignation he obtained patents and later assigned them to the Tubize Chatillon. Singmaster, in turn, contended that the idea was dismissed after some preliminary tests as unworkable; that he did not again work on the problem until his retention by Tubize as a consultant; that his first idea was subsequently enlarged upon and improved after 1927 when he left employ of the Zinc Company; that he did not have any agreement with the Zinc company as to policy on patents.

In connection with the opinion rendered orally by Judge Caffey Mr. Singmaster was asked by CHEMICAL MARKETS to give his views. He stated that until he had had an opportunity to study the written decision which had not as yet been released he would not make any comment, but that at a later date he would, in all probability, have a very important announcement to make.

American Stainless Steel of Pittsburg and Electro Metalurgical (Carbide subsidiary) will appeal to U. S. Circuit Court of Appeals at Baltimore from a federal court decision recently handed down in Baltimore in patent infringement suit of the two companies against Rustless Iron of America, according to Thomas D. McCloskey, president of Stainless Steel. Lower court held "Clement" patent on stainless iron under which suit was brought, to be invalid.

*On April 3 Soperton (Ga.) News was printed on slash pine tree paper, first paper to be so issued. Printers report it satisfactory.

‡Recruiting for candidates started April 6.

†Oral decision did not deal with all of the patents or applications involved.

FEBRUARY EMPLOYMENT AND PAYROLLS

Index Numbers in Manufacturing and Non-Manufacturing Industries

(12-month average 1926 = 100.)

	Employment			Payroll Totals		
Manufacturing Industries	*1932*	*1933*		*1932*	*1933*	
	Feb.	*Jan.*	*Feb.*	*Feb.*	*Jan.*	*Feb.*
General Index	65.6	56.6	57.5	49.6	35.8	36.4
Chemicals and allied products	80.3	75.2	76.5	70.6	59.5	59.7
Chemicals	88.9	85.4	86.8	70.7	60.4	61.4
Cottonseed oil, cake and meal	48.2	36.6	40.6	49.5	33.1	34.1
Druggists' preparations	78.8	73.9	70.5	81.2	72.5	70.0
Explosives	84.3	75.9	76.2	58.6	46.6	47.0
Fertilizers	56.6	49.9	56.7	40.4	32.5	32.6
Paints and varnishes	73.9	63.6	64.2	64.3	45.9	47.3
Petroleum refining	66.4	62.1	62.7	61.9	53.3	53.0
Rayon and allied products	149.2	148.3	149.1	136.5	123.5	121.0
Soap	96.5	94.2	95.1	89.7	77.0	78.0

Washington

Interest in Shannon Committee's report (Congressional investigation of government competition with private business) was revived with announcement that government helium plant will lower production costs still further.* One of the Committee's recommendations was that necessary helium supplies for airships Macon, Akron and Los Angeles should be purchased from private industry, providing cost was no higher than that prevailing in government operated plants. Operating at present capacity Amarillo, Texas, Government helium plant will produce during fiscal year ending June 30, total of approximately 18,000,000 cu. ft. By means of constant experiments and improvements cost of producing product has been reduced from $104 a 1,000 cu. ft. in 1920 to $7.10. Production cost probably will be brought down to approximately $5 a 1,000 cu. ft. within the next few months.

It requires approximately 9,000,000 cu. ft. to supply the Akron each year, based on one and one-half inflations, and similar amount for the Macon. Prospective surplus of helium this fiscal year, thus, will not be large. Helium for the new Macon, which will be floated soon, already has been transported to Akron, in specially constructed railway tank cars. Capacity of plant has been increased so that it is now capable of producing more than 37,000,000 cu. ft. of helium annually.

Muscle Shoals Bills

Senatorial normalcy returned March 9 with the introduction by Senator Norris of S. J. Res. 4, the new Norris Muscle Shoals resolution, with a number of important changes and omissions from S. J. Res. 15, which tends distinctly to recognize Muscle Shoals as a power, and not a nitrogen or fertilizer proposition. It strikes out all clauses on leasing plants, and emphasizes reforestation, proper use of marginal lands, and agricultural and industrial development of Tennessee valley. Except that bill proposes to inject Federal government into private enterprise (power) the proposal is less disadvantageous to fertilizer industry than previous bills.†

Norris' Muscle Shoals legislation copartner in the lower house, Rep. Hill (Ala.), introduced H. R. 1609. It is largely a duplication of Norris' previous bill, S. J. Res. 15, with one or two noteworthy changes. Sec. 5, par. b still provides for leasing to insure "mass production of fertilizer . . . . the existing plants and facilities and such additional plants and facilities as may be constructed."

*Complete destruction at sea of Akron April 5 may change the outlook for helium production materially.

†The President unexpectedly announced Shoals legislation will be ready for consideration week of April 10.

Proposed Hill Bill, in section devoted to policy (Sec. 14), states: "It is hereby declared to be the policy of the government to utilize Muscle Shoals properties for the fixation of nitrogen and the production of fertilizer for agricultural purposes in time of peace." Says Senator Norris in S. J. Res. 4 (Sec. 15) "It is hereby declared to be the policy of the government to utilize the Muscle Shoals properties so far as may be necessary to improve and cheapen the production of fertilizer and fertilizer ingredients by carrying out the provisions of this act."

McSwain Bill

Representative McSwain, chairman, Committee on Military Affairs has introduced H. R. 1672. Bill provides for creation of the "Tennessee Development Authority," with power to issue long-time bonds not exceeding a 40-year maturity, with interest at four per cent. Not to exceed $100,000,000 may be issued, to be secured by a lien upon the Muscle Shoals properties. This Authority would take possession and operate all or any part of the nitrate plants for the production of nitrogen or other fertilizer ingredients. It would also be authorized after a year to establish a phosphoric acid plant and to produce ammonium phosphate. The Authority would operate the hydro-electric and steam plants, and would sell at the switchboard any surplus power above that required in manufacturing fertilizers. Construction of Cove Creek Dam is authorized, and the Authority would be authorized to encourage development of private enterprise in the Tennessee Valley to develop customers for electric power, but would also be authorized to operate barges on the Tennessee River. This is largely a repetition of the "phosphoric acid plan" which provoked a great deal of discussion during the last session.

Personnel

Structural Gypsum vice-president Arthur J. Campbell has been appointed general manager. He has been connected with Structural Gypsum since 1926. He has had several important connections in the building field. Structural Gypsum, a Cyanamid subsidiary, has the following officers: William B. Bell, chairman of the board; Harry L. Derby, president.

John Beard, formerly with Sharples Specialty Co., Philadelphia, is now associated with Haveg Corp. of Newark, Delaware.

Briefly Summarized

E. R. Dick, formerly with Sherka, is now in charge of chemical dept. of George Uhe, N. Y. City broker . . . Frank W. Lane, formerly with Dorr is now at Newport, Del. in research work for Krebs Pigment . . . Harold Rowe is new assistant to a new National Lead president . . . David Aelony, research chemist for Gold Dust is now at Baltimore laboratories of the company . . . Edwin S. Cavett, resigned from A. C. Lawrence Leather chemical dept. to head research work for Marden-Wil Corp., Somerville, Mass., manufacturers of tanning oils, greases, etc. . . . Jerome Dohan has been transferred from Mutual Chemical's Jersey City works to Baltimore works . . . At annual meeting of Colloids, Inc., Newark, N. J., Frank A. Nelson and Alfred Katz were elected to board of directors . . . C. Marshall Taylor, formerly connected with Sharples Solvents, has been made manager, New Products Division G. M. Basford Co., N. Y. City advertising agency.

Personal

Chandler Medalist for 1933—Carbide's chief technologist and vice-president, Dr. George Oliver Curme, Jr., conducted his audience March 17 on a rapid tour of "chemistry in overalls," tracing progress in organic synthesis in industry from the perfection of the percussion cap in 1819 and the invention of dynamite by Nobel in 1862 to the most modern of improvements.

The Curme "tour" included momentous historical developments of a synthetic nature in the fields of explosives, pharmaceuticals, anaesthetics, celluloid and other cellulose products, various plastics, rayon, dyestuffs, and aliphatic chemicals affecting such diverse industries as motor fuels, lacquers, and textiles. Medalist was referred to by Columbia Professor, Arthur W. Hixson, "as perhaps the head of American chemists who have brought leadership in organic chemistry from Germany to U. S."

Sewell Avery, U. S. Gypsum president, has been elected member of the board of directors of Peoples' Gas, Light & Coke, Chicago.

Chas. W. Young & Co.'s chief chemist, Benjamin Leavitt, delivered lecture March 29 on "Manufacture of Soaps" at Beaver College, Jenkintown, Pa.

Wishnick-Tumpeer secretary, David Tumpeer (Chicago office) has returned from honeymoon trip.

P. C. Reilly, President, American Creosoting and Reilly Tar & Chemical was elected a director of Real Silk Hosiery.

I. C. I., N. Y. Ltd., president and director, George W. White, has been elected a United Carbon director. Mr. White is also a director of Canadian Industries, Ltd., of C. Tennant Sons & Co. of N. Y. and American Murex Corp.

Ill lay: George Bode, R. & H., North Hudson Hospital, Union City, N. J.; J. C. Blauvelt, Stein, Hall, of pneumonia.

Rosenthal In Japan

H. H. "Rosey" Rosenthal, president of the well-known brokerage firm of H. H. Rosenthal & Co., N. Y. City, has arrived in Japan. Mr. Rosenthal for years has been one of the largest chemical and drug traders with the Orient and his present visit has been made necessary by the tremendous increase in his company's business with the Far East. He will go on to China for a stay of several weeks and will return via the Philippines and Hawaii.

Bodman's Plans

F. L. Bodman will represent N. Y. Quinine (fine chemicals) Benzol Products (coal-tar medicinals) and Wah Chang (egg yolk) as sales agent in Philadelphia-Baltimore territory beginning May 1, with office in the Bourse, Philadelphia. Mr. Bodman, who was formerly service branch manager for Merck in this territory, and latterly sales manager of P-W-R., has a long experience and many close personal contacts in the fine chemical field.

Obituaries

Max Lissberger, 67, former Federated Metal's (now part of American Smelting) director and treasurer, died March 6. For years he was a partner in B. Lissberger & Co., N. Y. City non-ferrous metals refiners and smelters.

James J. Carpenter, 52, of Hammond-Carpenter, N. Y. City, importers of raw tanning materials, died March 11 at his home in Brooklyn.

Samuel W. Eckman, 53, former B. T. Babbitt president, died March 25 at his home in Forrest Hills, L. I.

Glass and Ceramic Notes

St. Joseph Lead, 230 Park ave., N. Y. City, is marketing new zinc oxide pigments for ceramics . . . Massillon Refractories exhibited new beryllium oxide refractories at recent American Ceramic Association meeting . . . Corning Glass' director of development and research, John C. Hostetter, is the new president . . . V. V. Kelsey, Consolidated Feldspar, is a trustee . . . He was busy selling "Buy American" idea at Pittsburgh convention . . . Allied Engineering, 87 W. Main st., Columbus, Ohio, is formed by J. T. Robinson and F. M. Hartford to design and construct ceramic plants and kilns . . . A new frost and moisture-resisting glass "Thermopane" is developed by Charles D. Haven, Milwaukee . . ."Armourplate," shown at Recent British Industries Fair, is a new glass, said to be four times as strong as ordinary. . . It is produced by Pilkington Bros., of England . . . Owens-Illinois has succeeded in producing a glass building brick or block . . . Syndicate headed by J. D. Grant, Hamilton, Ont., is reported ready to develop china clay deposits in northern Ontario . . . Ingram-Richardson Mfg. (enameled metal products)is incorporated at Frankfort, Ind. . . . Emerson P. Poste, 1932 American Ceramic Society president, has opened up a consulting practice on enameling at 99 Market st., Chattanooga . . . A. C. S. glass symposium chairman was F. C. Flint, chief chemist Hazel Atlas Glass . . . Speakers included Dr. J. T. Littleton, Corning Glass physicist; Donald Sharp, president, Bailey & Sharp, Hamburg, N. Y.; and H. H. Blan, Macbeth Evans Glass, Charleroi, Pa.

Company News

Re-election of all executive officers of Hercules Powder took place March 22 following annual organization meeting of company's directors. Officers re-elected: R. H. Dunham, president; C. A. Higgins, J. T. Skelly, T. W. Bacchus, C. D. Prickett, G. G. Rheuby and N. P. Rood, vice-presidents; C. C. Hoopes, treasurer; and E. B. Morrow, secretary.

Action marks 21st annual election of Russell H. Dunham as president, Mr. Dunham having served as chief executive since the founding of the company. J. T. Skelly and T. W. Bacchus have been vice-presidents over this same period.

Maintenance Supply removed to larger quarters March 10 at 114 E. 32 st., N. Y. City. Plant is in Long Island City.

Stoker Division of Patterson Foundry has appointed Skeldon Engineering of Toledo, as district representatives for Toledo territory on their commercial and industrial stokers, ash conveyors, cast iron ash storage tanks and soot blowers.

Dow's calcium arsenate and Bordeau plant was destroyed by $100,000 fire recently. Buildings will be rebuilt immediately and orders shipped from reserve stocks.

Inter-Allied Chemical Products has been organized and incorporated in Cleveland to operate a plant for the manufacture and distribution of chemicals and chemical products. Principals of the new concern are Gustav A. New, John E. Rooney and William Andes.

Coppus Engineering, Worcester, Mass., has appointed Cooper Pogue, Chamber of Commerce Bldg., Cincinnati, Ohio, as sales representative in Cincinnati district, for its line of Coppus-Annis Dry Type Air Filters for ventilating and industrial purposes.

Aurora Machine & Chemical has been organized in Baltimore to deal in compounds, chemicals, etc. Incorporators, Joseph Sindall, William H. Umbach and Harry M. Corrigan.

American Chemical Products, N. Y. City, manufacturing chemicals, soaps, oils, cements, etc., has been chartered at Albany.

J. A. Tumbler Laboratories, Ltd., Baltimore, will build plant at Toronto, Canada, for manufacture of polishes, waxes and dressings for automobiles and furniture.

Independent Air Filter has moved to larger quarters at 215 West Ohio st., Chicago, Illinois.

Harry Cohen, Atlanta manufacturers' representative, has been appointed representative in Georgia, Alabama, and Florida, for the white mineral oil dept., L. Sonneborn Sons.

G. A. Farrington, Chemical Appliances, Inc., N. Y. City, returned from Europe after successful visit to continent and British Isles. Mr. Farrington reports that he now has three Broadfield Units in operation in England; that a unit begins in Belgium this month and another in France in May.

Low cost instrument for measuring acid content of solutions and mixtures used in food, beverage and pharmaceutical fermentation and similar processes has been placed on the market by Westinghouse.

A. O. Smith Corp., of Milwaukee is making beer barrels of stainless steel, and claims successful method of making pitch to adhere to the inside.

Sol-Vo Chemical at 1429 Keesauqua Way, Des Moines, organized to manufacture cleanser. H. M. Stone is president.

New members in chemical section, National Safety Council: Pacific Bone Coal & Fertilizing Co., 1100 Financial Center Bldg., San Francisco; West End Chemical Co., San Bernardino County, Westend, Cal., D. H. Hellmers, plant superintendent.

Magnus Chemical, Garwood, N. J., is making new product for cement floors, Magnus Cement Cleaner and Renovator.

"Nichrome" V is a new series of "Nichrome alloys (nickel-chromium) now marketed by Driver-Harris.

National Oil Products is erecting new building ($125,000) to house new products and administrative offices.

Chemical Fads and Fancies

Freeport Texas' chairman, E. L. Norton, was on Frank A. Vanderlip's Committee of the Nation which favored embargo on gold, suspension of specie payments and guarantee of bank deposits. Need it be said that report appeared before the "panic?"———U. S. I.'s president, Charles S. Munson, is a new Drug, Inc., director. ———Imperial Chemical Industries is restoring all wage cuts.———Nobel Winner Langmuir urges federal law to create artificial labor shortage by means of shortened working hours.———Gregory Mangin, son of the well-known president of United Color, successfully defended his national indoor tennis championship. ———Few know that youthful Lewis W. Douglas, new director of the federal budget, is a chemist. He is M. I. T. and taught chemistry at school at Tarrytown, N. Y.———Lever Bros. chairman, F. D'Arcy Cooper, suggests all nations enter an agreement to reduce tariffs five per cent. annually until cut to the level of a revenue tariff.———Mr. and Mrs. Irenee du Pont have announced engagement of daughter Mariana to Henry Harper Silliman, also of Wilmington. ———Beer bottle orders are stirring up things for the soda ash producers.———D. Owen Evans, British Parliament member and International Nickel director, is in the States en route to Toronto.———Cyanamid's Landis sailed from England March 18 and arrived in New York with his usual reticence unchanged concerning those mysteriously frequent visits.——— British Industries Fair got off to a real start when the Prince of Wales opened the latch. Reports say exhibitors were highly enthusiastic.———Nitrous oxide gas may be the cure for undulant fever according to Cincinnati scientists.——— Pierre S. du Pont appointed by Delaware governor to a commission to recommend legislation to meet conditions that may arise from repeal of the 18th Amendment. ———B. L. Boye, connected with Standard of N. Y. for 34 years and now in charge of Socony-Vacuum asphalt sales, is the new head of the Asphalt Institute. ———Several of the rustless steel producers report much interest from brewers. ———Dr. A. C. Langmuir's Langmuir Medal awarded annually to the most promising chemist under 30 goes to another Californian in 1933, together with $1,000 to Dr. Frank Harold Spedding,———Mathieson's E. M. Allen is also president of the Westchester County Taxpayers' Association. Says Mr. Allen, "If necessary our organization will take action at the polls to force budget and tax equalization reforms. County's indebtedness has increased until it is greater than that of 40 of the 48 states.———Prof. Colin G. Fink of Columbia, addressing the Society of Forty-niners at 20th anniversary dinner recently, predicted "Direct conversion of sun energy into electrical energy promises to be one of the next outstanding accomplishments."———E. H. Watson, American-British Chemical Supplies vice-president accompanied Sir William Alexander, president of the British Federation of Industries, to Toronto and Montreal. Sir William, through his connection with the various Tenant enterprises, is an outstanding leader in development of British and Canadian manufacturing enterprises. Walter A. Koch, Victor Chemical vice-president, has charge of entertainment for the Chicago Drug and Chemical Association's annual banquet to be held late in April.———There are now 53 "dryice" plants in Europe.———The life span of storage batteries can now be forecast by the use of the X-ray camera.

Innis Speiden's Goessmann leaves the chemical industry

———L. E. Goessmann has resigned from Innis Speiden in order to devote more time to the management of his late brother's company, Fibrone Tubes, Jersey City.———*Industrial and Engineering Chemistry* has coined the expression "Nobel Laureate in Chemistry."——— Chemistry's "little giant" the micromanipulator, makes possible the creation of a chemical laboratory, so small that it may be set up under a microscope and used with practical results on particles too small for the naked eye to see, according to R. N. Titus, Eastman Kodak microscopist.———Joseph M. Franks, president of Franks Chemical Co., Brooklyn, severely injured in an automobile accident on March 7, is recovering slowly.———General Dyestuff president Ernest K. Kalbach has accepted chairmanship of the chemicals and paints division of the trade and industry committee of the Salvation Army Drive for funds. He has appointed as assistants, Reginald Richards of Swann, heavy chemicals; C. B. Peters, of Atmospheric Nitrogen, agricultural chemicals; Percy C, Magnus, fine chemicals; and Williams Haynes, publisher of CHEMICAL MARKETS, at large.———Dr. George Brown, Michigan professor of chemical engineering, will talk on "Agricultural alcohol" before the American Petroleum Institute meeting at Tulsa, May 17.———A. A. King, Albright and Wilson, Birmingham, England, sailed March 24 on the "Aquitania." He used Joseph Turner's office as N. Y. headquarters.———Du Pont is showing a series of rooms at its Atlantic City exhibit depicting the advance made in modern chemical materials.———Mrs. Franklin D. Roosevelt entertained the A. C. S. ladies at tea March 30.——— ———A N. Y. City consulting chemical engineer has a paint that is a fly repellant. A German discovery, he is anxious to interest someone in manufacturing in this country.———England produces 42,-500 tons of gypsum and imports 96,000 tons more.———Northeastern Section of the A. C. S. celebrated its 100th broadcast on chemistry March 10. Chairman of the committee is the Rev. M. J. Ahern, S. J., thus disputing the statement that religion and science are incompatible.———"Fine as a human hair" is a crude comparison to the wire used in the new 1/100 ampere instrument fuses—30 times finer than the human hair. Littlefuse Laboratories of Chicago is the maker.———S. D. Kirkpatrick, *"Chem. & Met."* editor, broadcast over WJZ March 13, "Priestley, Oxygen, and Modern Life."———J. M. Selden, Jr., formerly vice-president of Selden Co. of Pittsburgh and with Cyanamid after consolidation, is now with R. W. Greeff & Co. Latter's offices have been moved to larger quarters on 18th floor of 10 E. 40 st., N. Y. City.——— "Andy" Holmes is now in charge of sales for U. S. Potash.———Element 61, Illinium, discovered by X-Ray spectroscopy in 1926 by Prof. B. S. Hopkins, Illinois, has been isolated by Maurice Curie, nephew by marriage of Madame Curie.———Fernand Pisart, Katanga representative, (huge African copper producer) is expected back in N. Y. City at the end of April.———Over one hundred million tons of pure cellulose, 6,000,000 tons of sugars, and large quantities of gums and lignin are contained in the 300,000,000 tons of cornstalks, cotton stalks, and straw annually discarded as waste by American farmers.——C. Harold Smith, former Columbian Carbon vice-president, who once offered $1,000 for best way of disposing of his $10,000,000 fortune, left an estate appraised at $2,692,172 net.——— Miss Georgia Hencken, granddaughter of Mr. and Mrs. William S. Gray, will marry George Holmes Perkins in June.

Heavy Chemicals

Annual Statements

Breaking his well-known rule against personal statements, Allied's Orlando F. Weber said in commenting on company's annual report:

"The downward trend throughout the year of commodity consumption by basic industries was accompanied by inevitable intensification of competition, both foreign and domestic, with a resulting decline in price levels for many of the company's products. This decline was accelerated in part by depreciated foreign currencies and in some instances by the dumping of foreign commodities into the domestic market."

Said Chairman Clarence M. Brown of Pittsburg Plate Glass' board, "alkali business (Columbia Alkali subsidiary) suffered a considerable decline in tonnage. Low prices, which however, remained fairly firm at the level to which they had fallen in 1931, were partially compensated for by reduced manufacturing costs resulting from more efficient methods and improved operating conditions.

"Whiting, calcium chloride and steel purifier continue to offer promising opportunities for the future. Chemical research is being continued in interest of quality and yields of existing products; new processes have been developed and new products are in course of preparation".

Freight Rate Changes

Reconsideration of an earlier decision relating to carbon black, in carloads, shipped from points in northeastern Louisiana to Henry, Va., resulted in new I.C.C. order March 7, establishing freight rate at $1.03 per 100 lbs. Rates complained of by Blue Ridge Talc were $1.34 and $1.21, and previously commission set a rate of 40 per cent. of the first class rate, which worked out to be 98 cents per 100 lbs. Railroads asked reconsideration, declaring that carbon black rates should not be fixed on any definite relation to first class rates because producing industry migrates as gas becomes expensive as a raw material, consuming points are scarce, shipments are sporadic, and commodity rates should be established on a competitive basis rather than on a definite relation to a fixed rate.

N. Y. P. S. C. approved reduced "Pennsy" C. L. silicate of soda rates, minimum weight when dry in bags or bulk 50,000 lbs.; in boxes or barrels, 40,000 lbs.; other than dry in metal cans, in barrels or iron drums, 36,000 lbs., and in tanks, subject to rule 35, from Ebenezer to Corning and Painted Post (On Erie)—13.5c per hundred; reduction from class rates; effective March 26.

Effective until Aug. 31, 1933, importation and sale of sulfur, copper sulfate and other preparations used for treating vineyards, fruit trees and plants in Greece may take place only through Agricultural Bank of Greece.

Italian Sulfur

Sicilian Sulfur production during fiscal year 1931-32 totaled 261,641 metric tons, divided as to grades, as follows (in tons):—Superior yellow, 39,039; inferior yellow, 112,401; third good, 82,698; third common, 26,082; third common dark, 1,421. Total showed an increase of 12,341 tons from the 1930-31 output. Deliveries during 1931-32 decreased 10 per cent. to 187,276 tons. Exports, totaling 186,522 tons, against 198,543 tons in the preceding year, consisted of 152,686 tons of crude, and 33,836 tons of refined sulfur.

Producers are reported optimistic over outlook of regaining 50,000 ton Italian continental sulfur market, reestablishment of the consortium, and improvement in Mediterranean trade.

Canadian Silicate

National Silicates, Ltd., expect to proceed immediately with plant for manufacture of silicate of soda in the Toronto area. Thus one of the major lines of Canadian chemical importation is about to go on "made-in-Canada" basis. National Silicates, Ltd., is a comparatively new Canadian organization, associated with G. F. Sterne and Sons, Ltd., Brantford, and Philadelphia Quartz, Philadelphia. Products of the latter have been distributed by G. F. Sterne and Sons, and management and technical supervision of National Silicates, Ltd., as far as new manufacturing unit is concerned, will have the benefit of the engineering and sales organizations of these principals.

Appointments

S. I. Anderson, formerly with West Virginia Pulp & Paper, and more recently on the advertising sales staff of the Chemical Guide Book, is now with Hooker Electrochemical and assigned to mid-west territory.

George Omohundro, formerly with Cyanamid, is now operating Omo Products, Flushing, L. I.

Innis Speiden has created new position—assistant manager of sales, and former Cleveland manager, Pinckney L. Frost, is back in N. Y. City in that capacity. H. S. Cottrell is now in charge of the Chemical Dept. Company reports business slightly improved.

Russian alkali exports in 1932 compare with those in 1931 as follows:—ash, 22,463 metric tons, against 25,678 tons; caustic, 11,552 tons, against 27,753 tons; bicarbonate of potash, 6,731 tons, against 4,907 tons.

Ellarton Salt plant Warwick village, Lambton county, Ontario, has been purchased by a Montreal syndicate headed by Boris Wyckob, new owners planning to rebuild and operate plant, which has been idle for five or six years.

Linder & Co., Boston, has been appointed New England representative for Swann for the distribution of sodium phosphate.

Philipp Bros., have taken larger quarters in City Service Bldg., 70 Pine st., N. Y. City. Company occupied its Woolworth Bldg. offices for many years.

Chlorine Chemical, N. Y. City, is marketing new calcium hypochlorite cleanser "Da-Ko."

Morton Salt will exhibit working model of a salt plant at Chicago's World Fair.

Thompson, Weinman, pigment manufacturer, 52 Vanderbilt ave., N. Y. City, has moved executive offices to larger quarters at that address.

Rubber Field

Rubber Section, A. C. S., at Washington March 28 heard A. A. Somerville and W. F. Russell, R. T. Vanderbilt, on "Low Sulfur Compounding;" H. C. Jones of N. J. Zinc, on "Reactions During Vulcanization;" M. K. Easley, American Zinc Sales, Columbus, Ohio, on "The Effect of Acicular Zinc Oxide on The Physical Properties of a Rubber Compound." . . . Akron Rubber Section elected Harry Bourne, B. F. Goodrich, chairman at recent meeting. Papers read included: "Tire Cord and Other Fabrics;" L. A. Graybill, chief technical chemist, Bibb Mfg. Co., Macon, Ga. "Asbestos and Rubber Combinations," S. Collier, chief chemist, Johns-Manville, Waukegan, Ill. "Naphtha vs. Gasoline Refining and Effects on Materials Produced;" B. C. Dodd, Anderson-Prichard Oil Corp., Eastern Division Manager . . . Ralph B. Huber, former Fisk Rubber chemist, is now New England sales representative for D. H. Litter, N. Y. City dealers . . . C. J. Harwick, formerly with C. P. Hall, Akron, has formed Standard Chemical, Beacon Journal Bldg., Akron, and is offering rubber chemicals . . . Rubber Manufacturers Association of N. J. has decided to eliminate spring meeting and to meet in June for golf at Trenton Country Club.

Fertilizers

Davison Resignation

President Chester A. Fulton, Southern Phosphate, who was appointed director of sales for Davison Chemical*last December, has resigned from that position, but continues as chief executive of Southern Phosphate which has been affiliated with Davison Chemical because of latter's agreement to purchase stock holdings of several of Southern's large stockholders.

Southern Phosphate, one of the largest producers of raw Florida pebble phosphate, does an extensive domestic and foreign business in this commodity, which is used principally in the manufacture of superphosphate for commercial fertilizers. Davison Chemical, on Feb. 13 was placed in receivership. This in no way affects Southern Phosphate, which has always been conducted as an independent corporation.

Davison chemical receivers have notified all creditors of company that all claims and demands against company must be filed on or before May 31 with clerk of the Federal district court at Baltimore. Creditors failing to observe this notice will be barred from participating in any distribution of money and proceeds of the receivership estate.

Petition for receivership for Davison Realty, wholly owned subsidiary of Davison Chemical, has been filed in U. S. District Court, Baltimore, by Gray, McFawn & Co., of Detroit.

State and Treasury Departments denied March 8 that they had any official interest in exports of U. S. synthetic nitrate to Japan.

Sulfate Statistics

Imports of ammonium sulfate into U. S. which increased materially in 1932, continued trend of previous year during first two months of 1933. February imports amounted to 42,624 tons, compared with 38,644 tons in January and 19,232 tons in February, 1932. All-time peak importation of ammonium sulfate occurred in May, 1932, when 46,321 tons were imported.

Netherlands is chief source of U. S. imports. In January that country shipped 27,192 tons to U. S., and in February, 29,412 tons. Belgium ranks second as a source of imports, although Kwantung, a comparatively new source of ammonium sulfate, is gaining rapidly. In first two months of this year U. S. imported 8,287 tons from Kwantung, compared with 446 tons in the full year of 1932.

Production of ammonium sulfate in U. S. is chiefly a by-product in the manufacture of coke for steel production. Imports from Europe are produced synthetically.

Although imports of ammonium sulfate have been increasing sharply, another material used in the manufacture of fertilizer, Chilean nitrate, has declined as an import. In the first two months of this year, U. S. imported 2,872 tons of Chilean nitrate, compared with 42,215 tons in corresponding two months of 1932.

Potash Tax?

A New Mexico state measure proposing tax of 20c per ton on potash mined one of the State's newest industries, has been defeated in the Senate. Sponsor of the legislation, Representative Marie Cavanagh of Lincoln, said the Senate had "killed the most important bit of revenue legislation introduced in the Legislature."

Vote on the bill was 9 to 5, 10 members being absent. "I would like to know," she asked, "for what reason so many members left the Senate Chamber. Evidently powerful pressure was brought to bear on the Senate to kill this bill. Full responsibility for losing this source of revenue rests with the Senate."

Other states have placed at various times taxes of a similar nature on mined raw materials, notably a 75c a ton tax on sulfur in Texas. Recently a bill to increase tax to $1:50 was introduced in the legislature of that state.

Chilean nitrate sales during eight months ended with February were 100,000 tons above sales in corresponding period of previous nitrate year. To relieve unemployment companies and government have agreed to increase employment in several plants.

N. F. A. executive secretary Charles J. Brand has been elected to co-operating membership Florida Agricultural Research Institute.

Members of the Texas Legislature have canvassed sentiment in the House on prospects of reviving one or both measures proposing an increase in the State tax on sulfur production. These were unfavorably reported recently by the committee on revenue and taxation.

One bill would raise the tax on sulfur production from the present 75c per ton rate to $1.50, while another would increase it to $1 per ton. Only by a majority vote of the House, on a motion to print the minority report of the committee, can either bill be reinstated for consideration. Any excessive production taxes could be offset largely by shipments out of stocks above ground. Present Stocks are said to be sufficient for approximately four years at present rate of consumption.

Edward Ellis, 84, first to develop lime phosphate mines in California, died March 24 at Los Angeles.

C. C. James, mainland manager for Pacific Guano & Fertilizer, has resigned and is succeeded by Weller Noble, formerly manager for Southern California. He is now located at Berkeley offices. Paul J. Pauly has been appointed manager of southern division at Los Angeles.

Tag Sales

February fertilizer tag sales in Southern States were 18 per cent. less than those for February, 1932, and less than one-half of the sales for February, 1931. In five mid-Western States, sales for February were 28 per cent. less than the same month last year, and about 70 per cent. less than those for February, 1931. Ordinarily, February tag sales comprise about 11 per cent. of the year's sales.

Total February sales represented 311. 408 tons, against 382,804 tons one year previous, and 647,204 tons two years ago, Season is getting off to a slow start, according to N. F. A. officials. December and January sales showed an increase over the comparable months of the previous season, but a good part of this gain is rightly attributable to the stocking of tags at the beginning of the year.

In Brief—

Superphosphate production in Italy totaled 666,607 tons in 1932, compared with 802,509 tons in 1931 and 1,388,076 tons in 1930 . . . Phosphate production in Tunisia amounted to 1,678,000 metric tons in 1932, compared with 2,148,000 tons in 1931. Exports were 1,623,000 tons in 1932, compared with 1,784,000 tons in 1931 . . . Belgium exported 149, 083 tons of sulfate of ammonia during the first 11 months of 1932. During the corresponding period in 1931, these exports amounted to 146,698 tons. Imports of sulfate of ammonia were 10,345 tons in the 1932 period, against 70,407 tons in that period in 1931 . . . Unmined phosphate deposits in Utah, Wyoming and Idaho are sufficient to serve fertilizer trade with this important element for centuries after the resources of Florida and other States are exhausted, according to Oliver E. Baker, agricultural economist for U. S. Dept. of Agriculture. Calcium phosphate deposits in these three States amount to more than 12,000,000,000 tons. . . Proposed 25,000, 000-yen nitrogen manufacturing enterprise of South Manchuria Railway will be on an active production basis and its products will be on the market some time during the fall of next year, it is now announced . . . It is estimated that by July 900,000 tons of Chilean nitrate will have been sold, which will considerably reduce stock of 2,000,000 tons on hand in ports and nitrate plants.

*See Financial Section, p. 354 for announcement of removal of stock from N. Y. Stock Exchange Board.

I. C. C. News

Joint session of the I. C. C. was held in Washington March 13 to decide whether or not petition of Southern carriers and official classification carriers for reopening, consolidation, rehearing, and reconsideration in case of Docket 3151 (fertilizers and materials, including cottonseed cake, meal and hulls between Mississippi Valley territory and points north of the Ohio River) should be granted. Commission has ordered that Dockets Nos. 23177, 23177 (Sub-No. 1), 24252, 24252 (Sub-No. 1), 24172, and 25147 be reopened for further hearing for the purpose of deciding whether bones other than human or fresh meat bones should take the rates applicable on fertilizer materials. Commission further ordered that petitions in all other respects be denied. Presentation of the N. F. A. case was in the hands of traffic committee chairman, D. A. Dashiell, F. S. Royster Guano.

On March 25 I. C. C. concluded a two-day hearing on petition for general reduction of freight rates on agricultural products, coal, lumber and clay products. Organizations representing these commodities urged Commission to hold a full hearing at an early date looking toward a general freight rate reduction but more particularly on commodities named.

February Imports

February imports of fertilizer and fertilizer materials were slightly larger in the aggregate than those for February, 1932, but were about 36 per cent. smaller than the imports for February two years ago. February imports totaled 90,349 tons against 84,160 tons in 1932.

February exports of fertilizer were about 40 per cent. less than those for last February and about 42 per cent. less than those for February two years ago. Overseas shipments totaled 59,894 tons, against 98,264 tons in 1932.

Increase in total imports for February was due chiefly to larger receipts of sulfate of ammonia of which 42,624 tons were received, compared with 19,232 tons for last February. Imports of sodium nitrate amounted to only 2,516 tons, against 8,404 tons for last February and 68,421 tons for February, 1931.

Larger imports were marked during February for calcium nitrate, other nitrogenous materials, superphosphate and guano. More than 2,000 tons of superphosphate was received, 879 tons came from Belgium and 825 tons from Japan. Imports of potash materials were about 50 per cent. of the imports for February, 1932, and about 55 per cent. of the imports for February, 1931.

Dolomite limestone, added to complete fertilizers, which contain ammonium compounds will prevent them from increasing soil acidity.

Tariff Commission has postponed hearing set for April 17 in its investigation of alleged unfair practices in importation and sale of phosphates and apatite to later date.† Action was taken by commission at request of the respondents, Standard Wholesale Phosphate and Acid and Amtorg Trading.

George Buck, president, Patuxent Guano, Baltimore, has been appointed receiver by Judge Stump in U. S. Circuit Court, Baltimore.

W. R. Lebo Co., 5900 E. Marginal Way, Seattle, Wash., plans erection of fertilizer storage building to cost about $40,000.

A measure regulating fertilizer sales in North Carolina has not yet been extricated from prolonged discussion of the House committee on conservation and development. Bill requires fertilizer manufacturer to label each container with exact information as to ingredients. Materials injurious to the soil are prohibited. Measure also prohibits sale of fertilizer which did not contain at least 14 units of plant food, which would eliminate "8-2-2" formulae of eight units of phosphate, two of ammonia and two of potash, now used to a large extent in eastern North Carolina. Fertilizer regulation would be placed in the hands of the Commissioner of Agriculture.

Fine Chemicals

Merck Laboratory Dedication

Sir Harry Dale, director of the National Institute for Medical Research of England and world authority on pharmacology, will arrive shortly to give the principal address at the dedication of Merck's new $200,000 research laboratory on April 25. Dr. Dale was knighted in 1932, made commander of the British Empire (C.B.E.) in 1919, Fellow of the Royal Society in 1914; and in addition, is an M.A., M.D. and Fellow of the Royal College of Physicians. Others who will speak include Lammot du Pont, J. K. Lilly, Surgeon General Hugh S. Cumming and Governor N. Harry Moore. Over 300 leaders in medicine and chemistry will be present.

New Synthetic Camphor

At recent A. C. S. Meeting N. Y. U. Professor, John J. Ritter, announced a new method for the synthetic production of camphor from turpentine. "New method," he predicted, "will doubtlessly aid materially in establishing camphor industry in U. S., where it logically belongs." Process is reported as based on new principle in camphor synthesis, is more direct than existing methods, produces high grade product at minimized cost, and passes through intermediate stages never before employed. This is the second synthetic camphor announcement within 60 days—Lammot du Pont in his annual stockholders' report stated that a new process for synthetic production of camphor had been discovered. Du Pont Company is a very large consumer of camphor.* A review of camphor appeared in CHEMICAL MARKETS, Sept. 1932 p. 235.

Mallinckrodt vs. Squibb

U. S. District Court, western division, western district of Missouri, handed down Oct. 1 decision in the case of Mallinckrodt Chemical vs. E. R. Squibb & Sons. Mallinckrodt Chemical alleged that the defendant had infringed U. S. Patent No. 1 370,865, which is a patent for the mechanical closure of ether cans without the use of solder. Court held this patent valid and infringed and held plaintiff (Mallinckrodt Chemical) entitled to an injunction against future infringement and a decree for an accounting of profits.

Edward Lewis, who has represented Mallinckrodt for a number of years in N. Y. City and State, is transferring to Rochester. He will cover N. Y. State and western Pennsylvania.

Records of German foreign trade in 1932 show following exports of certain fine chemicals:—

	Quintals	*Marks*
Acetaldehyde, para and meta-aldehydes	929	96,000
Chloroform and chloral hydrate	2,105	511,000
Ether, Chloroethyl and other ethyl esters	3,442	765,000
Ethers, other	23,634	3,484,000
Fusel oil, amyl, butyl, and propyl alcohols	6,975	804,000
Glycerin, crude	3,856	110,000
refined	23,582	1,447,000
Hexamethylenetetramine	1,071	362,000
Methanol and acetone, crude	167	8,000
and acetone, refined and formaldehyde	94,522	4,980,000
Terpineol, vanillin, anethol, and other synthetic aromatics	7,988	5,654,000

Synthetic camphor production in Italy during 1932 has been estimated at about 600 tons, compared with approximately same amount in 1931 and 345 tons in 1930. About 50 per cent. of the production is generally exported. U. S. took 193 tons in the first 10 months of 1932. A synthetic camphor industry was first established in Italy in 1925. There is only one producer, with a stated capacity at present of 1,600 tons annually.

Charles Pfizer's April price list contains three declines including bismuth, subnitrate, potassium iodide and thymol iodide.

Merck is doubling its original Chicago World's Fair space.

*April issue of Du Pont Magazine contains interesting story on camphor.
†Now scheduled for May 22.

Coal Tar Chemicals

February Imports

Imports of synthetic dyes into U. S. in February totaled 365,144 lbs., valued at $369,829. Total compares with 429,298 lbs., valued at $367,154, imported in February, 1932. Imports in first two months of this year totaled 680,022 lbs., valued at $681,469, compared with 726, 564 lbs., valued at $626,712, in the corresponding period in 1932.

Origin of Dyes

	Percentages February 1933	1932
Germany	59.98	73.19
Switzerland	37.28	25.19
England	2.60	1.62
All others	.14	....

Leading Dyes in February Imports

	Pounds
Vat golden yellow GK double paste (single strength)	38,000
Vat printing black B paste	11,500
Ciba brown G paste	7,143
Vat printing yellow 5GK double paste (single strength)	7,000
Formal fast black G conc	6,614

Coaltar Products in Bond

	Pounds Dec. 31, 1932	Nov. 30, 1932
Dyes and colors	1,173,247	1,066,457
Intermediates	985,868	959,793

Imports of synthetic aromatic chemicals in February totaled 3,153 lbs. valued at $2,899, in comparison with 7,006 lbs., valued at $20,520, imported in February, 1932. Imports in first two months of this year totaled 5,897 lbs., valued at $6,959, compared with 9,416 lbs., valued at $23,371, imported in 1932 period. Salicylic aldehyde (1,102 lbs) was the biggest item in the February imports, this year.

Imports of medicinals, photographic developers, intermediates, and other coaltar products were 137,144 lbs., valued at $97,944, in February, compared with 108, 219 lbs., valued at $80,715, in February, 1932. Lbs. totals for first two months were:—This year, 192,231 lbs., valued at $138,424; last year, 146,841 lbs, valued at $107,116. The largest items in the February imports this year were:—

	Pounds
4-Nitro-2-anisidin hydrochloride	27,492
Sulphurated benzanthronecarbonic acid	8,782
Invadin N	8,333
Sulphureted phenetolcarbonic acid amide	8,070
Variamine blue salt B	7,900
Metacresol	6,432
Paranitrobenzoyl chloride	5,820

Imports of color lakes were only 10 lbs. in February. This made the two-month total 401 lbs. (values are not disclosed), compared with 1,932 lbs., in corresponding period in 1932.

Calco Ultramarine Agent

Calco has been appointed exclusive sales agent for Ultramarine Co. of N. Y. City. For many years Calco and Heller & Merz have marketed bulk of Ultramarine's goods and now sales have been placed entirely in their hands. National Ultramarine Co. brands, which were acquired two years ago, are also included.

*April 7 Commercial Solvents files petition asking that Union Solvents be adjudged guilty of contempt and made to pay penalty.

French exports of coal tar dyes during 1932 showed increase of more than 10,000 metric quintals over previous year. Increase in shipment of synthetic indigo from 1,020 (dry) and 8,236 quintals (paste) in 1931 to 4,299 and 13,824 quintals, respectively, in 1932 accounted for a large percentage of the larger exports. Imports were about 1,500 quintals lower in 1932.

New Specifications

British standard specifications for coaltar naphthas have been issued by British Standards Institution as B. S. S. No. 479, 1933. Specifications cover three grades of coaltar naphtha:—(1) Coaltar solvent naphtha (sp. g. 0.855), heavy coaltar naphtha (sp. g. 0.860 to 0.910), and heavy coaltar naphtha (sp. g. 0.855 to 0.945).

A complete specification is given for each grade and includes, among others, requirements for distillation range, specific gravity, freedom from impurities such as water, acids, alkalies, etc., and residue on evaporation. Detailed information as to the manner in which various tests are to be made is given in appendixes and conforms to recommended methods prepared by Standardization of Tar Products Tests Committee.

Specifications are of interest to producers of coaltar naphthas and are expected to be a valuable asset to processing industries, including soap, rubber, varnish, and dye, in which coaltar naphtha plays an important part.

Copies are obtainable from Publications Dept., British Standards Institution, 28, Victoria st., London, S. W. 1., price 2s. 2d.

Solvents

Commercial Solvents Wins

Supreme Court, March 6, refused review conviction of Union Solvents on infringement charges (patent for acetone and butyl alcohol production), thus establishing validity of patent issued to Charles Weizmann Sept. 9, 1919. Patent in original suit in Delaware Federal District Court was defended by Guaranty Trust, Butacet Corp., and Commercial Solvents. Union defended use of process on the ground that patent was invalid because it did not describe any patentable idea, but only the natural life process of the bacteria, and was merely a statement of results of permitting bacteria to function normally. Union appealed case, after losing in lower Court, to U. S. Circuit Court of Appeals, but again lost decision (Chemical Markets, Jan. 1933, p. 50). District Court, Dec. 10, confirmed validity of patent, and reaffirmed lower court order issuing injunction and directing Union to pay damages and profits to patent owning companies. Contest has been one of the most bitterly fought in the annals of chemical patent litigation.*

Sharples Plant Ready

Sharples Solvents has completed transference of manufacturing operations from Belle, W. Va., to Wyandotte, Mich. Operations were started at the new location March 10. Company, which specializes in amyl solvents made from pentane, changed its plant location in order to be more advantageously located with respect to consuming markets.

There are now over 5,000 power drycleaning plants in U. S. and Canada, doing a total yearly business of approximately $500,000,000. Since 1927 National Association of Dyers and Cleaners has maintained a laboratory at Silver Springs, Md., for research on dry-cleaning problems. A vocational school where members can obtain training is also located there.

P. S. C. has approved (effective March 1) cancellation by N. Y. C. of its rates on bisulfide of carbon from Chauncey to Buffalo, N. Y., and stations in vicinity of Buffalo. Rates were 38c per cwt., ordinary, and 34.5c per cwt. when in tank cars. Class rates apply, involving increases and reductions.

Linking agriculture with solvents industry, Commercial Solvents has completed booklet "Restoring Farmers' Buying Power." Nearly two bushels of corn are consumed in making the lacquer for a single automobile booklet points out, thus the purchase price of the automobile is returned to the farmer to assist him in buying an automobile and other commodities.

I. G. new solvent, "Buloxfl," is said to offer important new possibilities for manufacture of cellulose lacquers, and possibly may lead to a production of brushing lacquers. Chemically-speaking it is "methylbutlengly-colacetate."

Compared with other solvents it comes nearest to butyl acetate, but differs from the latter by its slower rate of evaporation and virtual absence of odor. Its evaporation time comes close to that of ethyl ester of lactic acid.

A. L. Webb & Sons have filed bill of complaint in Circuit Court, Baltimore, asking that a receiver be appointed for the assets of Industrial Laboratories.

Textile Chemicals

Summer Colors

Fourteen new colors for Summer have just been released to members of the Textile Color Card Association in advance swatch form. The 1933 Summer Card portraying these shades is now in preparation.

Significant among the new shades are three hazy tints with a pearly glow, appropriately named Nacre Grey, Nacre Blue and Nacre Beige. Yellows, increasingly important for sports and evening wear, are interpreted in two new shades. Sun Yellow is a radiant sunlight hue, while Liqueur Yellow, as its name implies, reflects a cool greenish cast. Two new blues further confirm the leadership of this color family in the Summer mode. Robin's Egg Blue, with a hint of green, is a smart new version of turquoise. Bali Blue suggests the clear intense blue of tropical skies. Of high fashion interest in the pink gamme is Parfait Pink, the deep luscious color of strawberry ice cream. Apricot Pink is a lighter fruit shade with a yellowish undertone. Camellia Red reflects the rich rosy red of the flower by that name.

Brilliant sharp colors, to be used alone or in combination with white, will also figure prominently in Summer fashions. These include Chili Red, an animated sports shade, and Blarney Green, a vibrant Irish hue. Completing this group of colors are two attenuated shades, Wheat Beige, a pale yellowish tone, and Skymist, a light Summer grey.

Latest Dyes

Patent Blue V F, new acid blue dye, by General Aniline is being offered by General Dyestuff. Dyed from a Glauber's salt-sulfuric acid bath it produces a greenish blue brighter than current Patent Blue V brands. It dyes very level and is recommended for self-shades as well as combination shades, especially for ladies' dress goods to meet ordinary fastness requirement.

Du Pont's dyestuffs division has developed Pontamine Fast Orange RGL, a direct color which is expected to find its greatest use in dyeing cotton and rayon piece goods and yarns for tapestries, draperies and similar materials requiring excellent light fastness. New dye differs chemically from other offerings and in shade is between Pontamine Fast Orange 2GL and Pontamine Fast Brown 4GL. It is fast to light, perspiration and washing, and may be dyed on cotton and rayon in all forms.

Society of the Chemical Industry, Basle, has marketed two new dyestuffs, Cibanone green 2G and GN of the fast vat series. They are said to exhibit excellent fastness to light and chlorine. They have also good resistance to washing, soda boiling and mercerizing. Level dyeing properties are good and the colors are recommended for use with all forms of cotton and the cellulose rayons.

Rayon Prices Lower

List prices for rayon yarns were cut 16 2/3 per cent., effective April 1, following announcement earlier in the week that producers were curtailing operations 30 per cent.

Production of rayon yarns during March was curtailed to about 70 per cent. of capacity, states *Textile Organon*, published by Tubize Chatillon. This would give approximately an average rate of production of 90 per cent. for the first quarter of the year, or, on the basis of $160,000,000 pounds annual operating capacity, about 35,000,000 pounds of rayon produced in first quarter.

"Stocks on hand at the end of March," states the *Organon*, "probably amounted to five or six weeks' supply as against a supply sufficient for less than three weeks at the end of 1932.

Non-Slip Finishes

From Manchester, England come reports indicating British finishers are devoting attention to non-slip finishes for rayons. British finishers and users of rayon fabrics have had trouble in past two years with lower quality materials which have shown tendency to fray or slip when subjected to friction.

Fault is generally admitted to be due to insufficient warp or filling threads. New British finishing processes depend on discovery that impregnation of a rayon fabric with comparatively small quantities of resinous or adhesive substances can change it from one which slips badly to a fabric with an appearance of firmness and durability. But treatment merely makes rayon yarns more adhesive, and unfortunately most of the resinous assistants are removed by simple washing of the fabric according to reports. Finisher merely camouflages an inferior fabric to look satisfactory to the purchaser and wearer, who subsequently finds out the deception.

Funke Organizes

Carl A. Funke, formerly with Calco, is now secretary of Nova Chemical, 200 Hudson st., N. Y. City, R. H. Funke is president of new company which will specialize in dyestuffs, chemicals and textile specialties. It will represent manufacturers, including newly formed Pfister Chemical, Ridgefield, N. J., producers of a new fast dye line.

Walter W. Clayton, 64, president of Fredora Dye, Paterson, died at a Paterson hospital, March 6.

James V. Meola, 62, president, Lido Dye, of Paterson, died at his home in that city March 5.

Spring Meeting

N. Y. chapter, Lowell Textile Institute Alumni, came together March 15 for social and business gathering. Plans were laid for a possible grouping together of all members affiliated with other textile institutions of this country into one big unit.

Following officers were elected: president, Adolph J. Winkler, 40 Worth st.; vice-president, L. J. Dogin, American Aniline Products; secretary, Charles C. Jessop of Louis Levy.

Du Pont is now merchandising its chalk finish, low luster rayon yarns that have been selling to hosiery, underwear mills and some of better grade makers of woven and pile fabrics for last nine months, under a new trade name. These chalk finish yarns will now be marketed under name "Duponaise."

Glyco Fellowship

Textile Chemistry and Dyeing Dept. School of Textile Engineering, Alabama Poly, has been awarded fellowship by Glyco Products. This is second scholarship established by this company recently in a textile college. First was awarded to Clemson a month ago.

Discovery that considerable savings in equipment, time and consumption of alkali can be effected in process of cotton mercerization by omitting preliminary boiling with water and immersing cotton directly in an alkali bath in presence of certain wetting agents, has led to introduction of a whole series of substances which speed up the rate at which the cotton fibres are impregnated by the alkali. Among the latter are a very large number of special preparations including mixtures of cresol and cyclohexanol, sulfonated higher alcohols and sulfonated glycol ethers. It is now reported that even more rapid wetting can be effected with the aid of light wood creosote, by-product of the manufacture of pure creosote for pharmaceutical purposes in the course of wood tar distillation. According to Dr. W. Pohl, writing in "*Chemiker-Zeitung*," (Feb. 22, 1933, p. 142), speed of wetting of dry cotton with 20 per cent. sodium hydroxide solution employed in mercerization is increased to an extraordinary extent by addition of 1.5 gram of light creosote to each liter of the bath. Light creosote thus appears to be superior to many of the commercial preparations which require to be added to the mercerization bath in 10 times the above quantity.

Paints, Lacquers and Varnish

Investigation

Investigation of charges of unfair competition in importation of oxides of iron suitable for pigment purposes was ordered March 9 by the Tariff Commission. Complaints of unfair competition were filed by Magnetic Pigment, N. Y. City, Oct. 18, 1932, and Feb. 24, 1933. Commission's order names as respondents Northern Pigment, New Toronto, Can.; Bruce Ross, Ltd., Toronto; Stanley Doggett, Inc., N. Y. City; and C. J. Osborn Co., N. Y. City. Charge is infringement of U. S. patent No. 1327061 and 1368748.*

Kenneth A. Coate, Calco, is now covering paint and color industry in Chicago area. He maintains headquarters at Heller & Merz, 146 W. Kinzie st., contacting the paint and varnish, leather, textile and kindred trades of the middle country.

Frederick A. Stresen-Reuter, Chicago chemical and drier manufacturer, is in California on a business and vacation jaunt.

W. B. Leslie is a manufacturers' representative at 416 Penton Bldg., Cleveland. He will represent Archer-Daniels-Midland, Western Dry Color, St. Joseph Lead, Thurston & Braidich, and Pennor Iron Oxides, and will operate as W. B. Leslie Co. Mr. Leslie at one time represented Spencer Kellogg in Cleveland and more recently was with J. H. Hinz Co.

S. R. Grovenstein, Archer-Daniels-Midland, Minneapolis, and J. O. Kaser, Glidden, were guest speakers at March meeting of Cleveland Production club. Mr. Grovenstein talked on "Linseed Oil in Lacquer" and Mr. Kaser on "Cost Accounting."

*Hearing is postponed from April 25 to May 10.

J. F. Menefee, Merchants and Manufacturers Paint, has been named chairman of committee to work up a financial program for the April clean up and paint up campagin, Louisville Paint, Oil and Varnish Club.

Personal

Ken R. Dyke, Johns-Manville sales promotion and advertising manager, has been promoted to be executive vice-president in charge of sales and merchandising for Johns-Manville Sales Corp.

Floyd E. Francis, 52, well-known purchasing agent for Pittsburg Plate Glass at Milwaukee, died March 12. He had been ill for the past six months.

Henry W. Greenhood formerly superintendent for M. Friedman Paint, Oakland, Cal., has joined chemical engineering organization of Hal R. Harlan, San Francisco. Mr. Greenhood is in charge of paint, varnish and lacquer division, at 325 Fremont st.

Frank H. Morris, 32, chief chemist and factory manager, Pierce & Stevens Paint, Buffalo, died March 1. He was secretary of the Western N. Y. Paint & Varnish Production Club.

Francis K. Glidden, 77, retired vice-president of original Glidden Varnish, and son of the founder of the company, died March 14 in Palm Beach, Fla.

Frank J. Donahue, 51, president, F. J. Donahue Varnish Co., Detroit, died March 7.

At Mississippi State Experiment Station Starkville, 1,300 tung trees have recently been planted. Tests with these trees are designed to furnish information as to spacing, fertilizers, and whether they grow better in the rough or under cultivation.

Paint, Varnish and Lacquer Sales

Sales of paint, varnish and lacquer products in January totaled $12,782,859 in value, according to a preliminary report by the Bureau of Census from data received from 588 establishments. This compared with sales of $10,127,780 in December and $15,894,506 in January, 1932. A record of sales in January compared with revised figures on October and November sales and preliminary figures for last December, follows:

		Classified sales reported by 344 establishments				
		Industrial sales				
1933	*Total sales reported by 588 establishments*	*Total*	*Paint and varnish*	*Lacquer*	*Trade sales of paint, varnish lacquer*	*Unclassified sales reported by 244 establishments*
January†	$12,782,859	$5,218,874	$4,073,343	$1,145,531	$4,073,343	$3,490,642
1932						
January	15,894,506	Comparable statistics not available.				
February	16,270,822					
March	19,089,005					
April	22,612,193					
May	24,981,441					
June	19,637,358	4,685,399	3,617,719	1,067,680	8,734,330	6,217,629
July	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
August	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
September	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
October*	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
November*	13,260,328	3,599,319	2,639,362	959,957	5,196,766	4,464,243
December†	10,127,780	3,222,770	2,186,706	1,036,064	3,506,715	3,398,295
Totals, year	$204,734,085	....	....	....	....	....
Totals, 1931	$278,442,170.					
Totals, 1930	$348,400,057.					

*Revised. †Preliminary.

Stanley Chemical, East Berlin, Conn., has introduced new product, "Hand Save," which protects hands of users of lacquers, paints, varnishes.

Sun Oil, large producer of petroleum thinner for paint and varnish products, has issued interesting folder—subject "Sunoco" spirits. For copies address Solvents Dept., 1610 Walnut st., Phila.

Associations

Dr. C. D. Holley, Sherwin Williams director of research, addressed Louisville Paint and Varnish Club at meeting held March 23. He discussed present-day methods of paint manufacturing as compared with early day methods. Dr. Holley also spoke before the Production Club of Chicago, April 3 on "Paint Fundamentals and Their Applications."

Baltimore Paint and Varnish Production Club monthly meeting March 3 at Stafford Hotel was addressed by J. W. Church, of Pure Calcium Products, who spoke on newly developed calcium product for use in paints. He was accompanied by E. W. Boughton, of R. T. Vanderbilt.

Marshall Dill, San Francisco, representing Quigley Co., N. Y. City (acid proof cements) has added S. F. Murphy, Jr., to sales force. Marshall Dill has been named to represent Vitro Mfg. of Pittsburg on Pacific Coast, and will carry stocks of ceramic raw materials and colors in Los Angeles, San Francisco, Portland and Seattle.

Hercules is mailing new booklet "Prevention of Gas in Pigmented Nitrocellulose Lacquers". Copies are available from Wilmington main office.

Cyanamid has secured exclusive sales rights on all ores and pigments mined from the Mabelite deposit controlled by Eastern Mabelite Corp., 225 Mercer st., N. Y. City.

Imperial Color's Detroit office has been moved to Machinery Bldg., 2842 West Grand Blvd. W. H. Hasse, is local manager.

T. J. Ronan Co., N. Y. City, paint and varnish makers, moved March 1 to new factory and office at 749 E. 135 st.

Glyco Products, Brooklyn, is now producing Esterpol a new light straw-colored transparent resin on a semi-commercial scale. Detailed information is available from the company.

Federal Specifications Board, Washington, is mailing to those interested proposed new specification for turpentine for paint type 2, which is a revision of LLL-T, 791a, July 26, 1932.

Naval Stores

New Hercules Products

A number of new terpene compounds, now available in high purity form for research purposes and industrial application, have been developed by Hercules Powder.

Terpenes, recovered from southern pines by the steam and solvent process, present an array of organic raw materials capable of extensive chemical and commercial use. Alpha pinene, now used in large amounts for synthetic production of camphor, is an example of terpene chemical development. Other materials announced by Hercules as now being supplied in grades suitable for research are: abietic acid, borneol, bornyl acetate, bornyl chloride, dipentene, fenchyl alcohol, fenchyl acetate, fenchyl amine, fenchone, methyl abietate, alpha pinene, terpin, terpin hydrate, alpha terpinene, alpha terpineol.

Rate Protests

On protests from naval stores trade and from consignees proposed increase in railroad rates on naval stores in carloads from Southern territory to destinations in eastern Canada has been suspended for investigation by I. C. C. Hearing has been set before Examiner Barry in Washington, April 19.

Proposed increase would have raised rates in amounts varying from 3c to 4½c per 100 lbs., from Savannah, and from 3c to 13c per 100 lbs., from Jacksonville to destination area.

L. B. Sless Co. organized at Jacksonville, Fla., with sales representatives in principal cities, to deal in special naval stores and pine products. Company is headed by L. B. Sless of N. Y. City and Jacksonville.

Australian turpentine imports for fiscal year 1931-32 totaled 424,230 gallons, valued at £59,816, practically all of which originated in U. S. Figures for 1931-32, compare with 385,046 gallons, valued at £49,544, entering country in 1930-31. Prior to past fiscal period France was Australia's leading supplier of rosin. Receipts of this commodity for 1931-32 amounted to 131,297 hundredweights, valued at £76,273, of which 65,099 hundredweights valued at £31,700 was imported from France.

Savannah Board Acts

Savannah Board of Trade has adopted resolution requesting Dept. of Agriculture to collect, compile and distribute statistics of production and stocks of naval stores for season ending March 31, and to do so promptly.

February production of naval stores by steam distillation and solvent treatment of wood and stocks of these products on hand February 28, according to data collected by the producers' committee, through Arthur Langmeier, of the Hercules Powder Company, secretary, were as follows:—

Production

	Rosin 500-lb. barrels	Turpentine bbls. 50 gallons)	Pine oil Gallons
Month of Feb.	25,583	4,175	186,598
Total from Apr. 1, 1932	329,326	54,038	2,194,787

Stocks at Plants

Total Feb. 28 1933	104,223	14,399	....
Mar. 31, 1932	90,540	5,835	....
Change	+13,683	+8,564	....

Note:—Rosin production and stocks include all grades of wood rosin.

Turpentine stocks in London were only 14,200 barrels early in March, compared with 27,000 barrels at that time last year and 49,300 barrels two years previous.

Irving Post, 55, widely known naval stores industry leader, died at his home in Savannah, March 5. He became connected with industry in 1897. In 1932 he, with G. A. Wharry, launched the Irving Post Co., of which he was president at the time of his death.

A. Probart Jones, of Bowring, Jones & Tidy, London, after visit to southern naval stores centers sailed on the Olympic, March 31. Cecil K. Dodd, of Fairclough, Dodd & Jones, London sailed on April 5.

Joseph Schneider, Paris dealer in naval stores, also sailed for home recently.

D. B. Warnell and Sons Pembroke, Ga., manufacturers of naval stores products, have acquired 1,640 acres in Chatham county to add to their timber holdings in South Georgia.

John W. Dilworth, 66, partner of Loos & Dilworth, naval stores, Philadelphia, died at his home at Jenkinstown, Pa.

Ocean Rates Lower

Lower naval stores ocean freight rates to United Kingdom and Irish ports were announced March 8 after Chicago Gulf-United Kingdom steamship conference meeting. New rates immediately effective apply to May 31. To group 1 ports, including Liverpool, London, Manchester, Bristol, Glasgow and Avanmouth, rate on rosin under deck has been lowered to 21½c and on deck to 19½c. To group 2 ports, including all other United Kingdom ports and Irish ports, rate under deck has been cut to 26½c and on deck 24½c. On turpentine, in iron and steel drums, group 1 ports take rate of $2.15 per drum, and group 2, $2.40. Rate on wooden barrels will be $2.65 and $2.90 respectively. Gulf-Bordeaux-Hamburg range conference has adopted same rates as quoted to group 1 ports above.

Gums, Waxes, Shellac

Shellac exports from Calcutta in 1932, with comparative figures for 1931, 1930, and 1929, show decline of 152,700 packages from peak export during that period.

	Packages		
	Orange	*Garnet*	*Button*
United States	51,554	3,071	424
*United Kingdom	54,576	3,851	5,429
Continent	42,522	1,914	1,519
South America	2,798	....	9
China	2,564	....	10
Japan	19,305	156	27
Australia and New Zealand	2,993	35	539
All other ports	4,179	....	77
Totals, 1932	180,491	9,027	8,034
1931	202,646	8,818	9,819
1930	257,843	15,151	11,348
1929	333,204	19,367	11,515

	Packages		
	Sticklac	*Seedlac*	*Refuse lac*
United States	....	62,253	....
*United Kingdom	259	7,261	33
Continent	1,174	16,126	13,655
South America	....	....	....
China	....	....	....
Japan	....	....	....
Australia and New Zealand	....	....	....
All other ports	....	2	....
Totals, 1932	1,433	85,642	13,688
1931	4,476	68,405	26,279
1930	....	....	....
1929	....	....	....

*Includes Havana, Cuba.

Acme Shellac, March 8, filed with Federal Trade Commission denial that tradename and label create confusion with genuine shellac.

Gum Association Meets

American Gum Importers' Association quarterly meeting was held March 14 at the Downtown Athletic Club, N. Y. City. Discussion centered in the research work started last September. Batavia Gum Association has advised American importers that a bill is now before the colonial government to provide funds for research work on natural gums and the major portion of this fund will be given the American importers to enable them to add another chemist to their laboratory staff.

In the 1933 Chemical Guide Book the secretary of the American Gum Importers' Association is erroneously given as L. W. Babbage. A. J. Wittenberg, 17 Battery Place, N. Y. City, is the Association secretary.

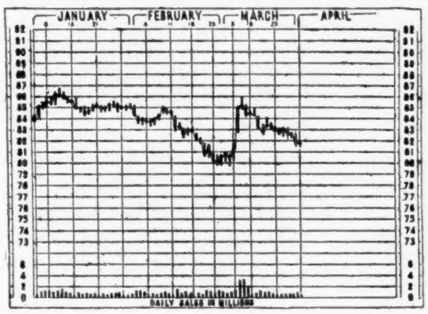
The Financial Markets

Crisis

The stock market in the past month passed through perhaps the most critical period in the economic history of the country with a remarkable showing of strength. Approach of the banking crisis brought about fresh weakness throughout the list, but the prompt action of the government in immediately declaring a bank moratorium, closing the exchanges, summarily stopped unbridled liquidation.

After a 10 day suspension the markets opened March 15 with a spirited advance, reflecting the bullish sentiments aroused

Daily Record of Stock Market Trend



—*N. Y. Herald Tribune*

by the several important acts of the President and Congress designed to effectively deal with the existing conditions. Despite many particularly bad looking situations sentiment was quite evidently optimistic that the measures passed had saved the country from financial and economic demoralization, and that from now on the trend would be definitely upward. In the first three days after resumption of trading prices advanced strongly, and practically all of the losses incurred during February were recovered. Late on March 17 stocks again turned reactionary. During the balance of the month they drifted downward in exceptionally light trading and held only a small part of their gains. The decline is largely attributed in financial circles to belated liquidation and not to any feeling of loss of confidence.

Based on the movements of 240 stocks, comprising 20 groups listed on the N. Y. Stock Exchange, an appreciation of \$177,172,203 in values, equivalent to 1½ per cent., compared with a loss of \$2,043,723,062, or 16 per cent., in February, according to the *N. Y. Times*. In March, 1932, loss in the same number of issues was \$1,925,902,983, equal to 17 per cent.

Following table shows the changes in the 20 groups of the *N. Y. Times*.

Group and Number of Issues	*March, 1933* Avr. Net Ch'ge in Points	*Change in Values*
Amusements (5)	— .750	— \$6,394,390
Building equipment (9)	+ .792	+ 15,201,377
Business equipment (4)	+ 1.281	+ 7,540,296
Chain stores (14)	+ .571	+ 10,845,591
Chemicals (9)	**+ 1.430**	**+ 24,037,138**
Coppers (15)	+ .717	+ 37,354,832
Department stores (10)	+ 1.350	+ 10,702,731
Foods (19)	+ 1.829	+ 94,278,706
Leathers (4)	+ 1.531	+ 2,234,471
Mail order (3)	+ 1.750	+ 24,976,768
Motors (15)	+ .467	+ 53,275,542
Motor equipment (7)	+ .321	+ 2,048,847
Oils (22)	+ .290	+ 86,136,036
Public utilities (29)	— 2.039	— 369,131,334
Railroads (25)	+ 1.235	+ 65,578,967
Railroad equipment (8)	+ 1.281	+ 19,452,018
Rubber (6)	+ .937	+ 6,577,327
Steels (13)	+ 1.538	+ 39,721,484
Sugars (9)	+ 2.931	+ 19,723,200
Tobaccos (14)	+ 1.687	+ 33,012,596
Aver. and total 240 issues	+ .721	+ \$177,172,203

The trend in the market since the end of September, 1929, showed stocks advanced in sixteen of the forty-two months. Values are now about 78 per cent. below those at the September close four years ago.

Chemical Group

The chemical group showed up quite strongly after the resumption of trading and in the list of nine leading industrial chemical stocks in the *Times* index seven registered advances for the month, one, Davison Chemical (in the hands of a receiver) showed a loss and du Pont closed without change one way or the other.

	Increase	*Decrease*
Allied Chemical & Dye	\$4,202,254	......
Com'l Solvents Corp.	8,223,390	......
Davison Chemical Co.	....	\$252,033
Du Pont de Nemours & Co.	....	......
Mathieson Alkali Works	325,218	......
Texas Gulf Sulphur	952,650	......
Union Carbide & Carbon	8,068,727	......
U. S. Industrial Alcohol	2,336,525	......
Virginia Carolina Chem.	180,407	......
Total	\$24,289,171	\$252,033

U. S. I. with a gain of 6¼ points and Corn Products with 6⅛ points were the outstanding advances in the chemical group. Commercial Solvents advanced 3¼ pounds. The strong possibility that federal or state legislation will demand a percentage of alcohol in motor fuel mixtures aided materially in the advance in alcohol shares.

1932 Earnings

Several important chemical companies issued their annual financial statements during the past month (Cyanamid, Allied, Monsanto, etc. These are given in detail in the following pages. In general the statements reflect the further drastic retrenchment that took place in industry in the past year. One encouraging angle is, however, that in most of the statements the final quarter of 1932 showed up better than the third quarter. Without attempting to minimize the seriousness of the banking crisis and its temporary effect on business activity, many of our leading executives insist that the turn came in July of 1932 and the upward movement was only delayed by the events of March 4-15.

Price Receivership

Petition asking that Price Brothers & Co., Ltd., one of Canada's leading newsprint companies, be declared in bankruptcy was filed March 31 in Quebec by counsel for Duke-Price Power. Argument on petition will be heard before a judge of the Superior Court on April 10. Gordon W. Scott, accountant, of Montreal, has been appointed interim receiver.

Protective committee for the first-mortgage bonds of Price Brothers issued March 31 following statement:

"It has for some time been apparent that it would be necessary to put the company into bankruptcy or liquidation for the conservation of the property until such time as a plan for reorganization can be formulated and to assist in dealing with the difficulties of the company in the interim. Mr. Scott has the highest qualifications and this committee welcomes his appointment as interim receiver.

"A meeting of the committee has been called to authorize such action as may be advisable at this time for the protection of the bondholders' interests. Over 62 per cent. of the bonds are now represented by the committee, which desires to call to the attention of bondholders who have not to date deposited their bonds the fact that the situation may now crystallize rapidly and that it is important that bondholders who intend to deposit their bonds do so immediately."

McKesson & Robbins, directors have voted to reduce value of fixed assets, including lands, buildings, equipment and leaseholds, from \$10,909,778 to \$5,573,000. Of this reduction, \$4,000,000 will be applied as a reserve against slow assets.

Price Trend of Chemical Company Stocks

	Feb. 25	*Mar. 3*	*Mar. 10*	*Mar. 17*	*Mar. 24*	*Mar. 30*	*Net Change*
Allied	76½	77½	...	84¼	78¾	75½	—1
Air Reduction	50⅝	48½	...	59½	57¼	54½*	+3⅞
Anaconda	6⅛	5⅞	...	7⅞	7¼	6½	+ ⅜
Columbian Carbon	26½	27	...	31½	30½	26¼	— ¼
Commercial Solvent	10¼	10⅜	...	12⅜	12⅛	12¾	+2½
Du Pont	35⅛	35½	...	40	38	34	—1⅛
Mathieson	15⅛	15	...	16¼	16	15½	+ ⅜
Monsanto	27	25	...	30	28½	29⅛	+2⅛
Ltd. N. J.	23¾	24	...	26¼	26⅛	25⅜	+1⅝
Texas Gulf	17	17	...	19⅛	17¾	17	.....
U. S. I.	17	15½	...	29½	20½	20⅜	+4⅞

*ex-dividend.

Off List

Davison Chemical Co. common of no par value was stricken from list of the N. Y. Stock Exchange March 28 and admitted to N. Y. Produce Exchange.

Davison Realty protective committee has been formed to protect holders of 10-year 6% sinking fund bonds. Members of the committee are: Cloud L. Cray, chairman, Pelham C. Wilmerding and L. C. Jenkins. W. L. Murray is secretary. House, Holthusen & McCloskey are counsel and Bankers Trust, N. Y. City is depositary.

Cleveland-Cliffs Iron directors have taken no action in regard to a dividend on no par $5 cum. pref. stock. A distribution of 5 cents per share was made on Dec. 15 last, first payment since June 15, 1931, when a regular quarterly dividend of $1.25 per share was paid on this issue.

International Nickel Co. of Canada, Ltd. stockholders on March 28 voted (a) to reduce share capital by canceling 167 shares of pref. stock of $100 par and 14.454 shares of common stock without par value surrendered to company for cancellation since Dec. 13, 1929; and (b) to increase the authorized capital stock by the amount of such reduction in the share capital.

Tennessee Corp. stockholders will vote April 27 on changing par value of common from no par to $5 per share.

American Home Products Corporation reduced its monthly dividend from 35 cents to 25 cents, March 24. Action, according to management, was taken to preserve cash position, in consequence of the bank holiday. Company earned approximately $695,000 in first quarter.

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Labs........	.50	Mar. 17	Apr. 1
Air Reduction......	.75	Mar. 31	Apr. 15
Allied Chem., pf....	$.175	Mar. 10	Apr. 1
Amer. Home Prods..	.35	Mar. 14	Apr. 1
Amer. Maize Prods..	.25	Mar. 22	Mar. 31
Amer. Maize Prods, pf..............	$1.75	Mar. 22	Mar. 31
Can. Celanese 7% cu pr, pf...........	$1.75	Mar. 18	Mar. 31
Celanese Corp., 7% cum pr, pf.......	$1.75	Mar. 18	Apr. 1
Clorax Chemical....	.50	Mar. 20	Apr. 1
Colgate Palm-Peet, pf..............	$1.50	Mar. 10	Apr. 1
Courtaulds Ltd., Final E. 2¾%....			
Devoe & Reynolds 1st pf...........	$1.75	Mar. 21	Apr. 1
Devoe & Reynolds 2nd pf...........	$1.75	Mar. 21	Apr. 1
Du Pont deb........	$1.50	Apr. 10	Apr. 25
Eastman Kodak....	.75	Mar. 4	Apr. 1
Freeport Texas new 6% pf ini........	$1.50	Apr. 14	May 1
General Printing Ink pf..............	$1.50	Mar. 27	Apr. 1
Gledden Co. pr pf...	$1.75	Mar. 17	Apr. 1
Hercules Powder....	.37½	Mar. 14	Mar. 25
Heyden Chem., pf...	$1.75	Mar. 15	Apr. 1
Industrial Rayon...	.50	Mar. 27	Apr. 1
Intern. Nickel, pf...	$1.75	Apr. 1	May 1
Koppers Gas & Coke pf..............	$1.50	Mar. 11	Apr. 1
MacAndrews & Forbes	.25	Mar. 31	Apr. 15
MacAndrews & Forbes pf..............	$1.50	Mar. 31	Apr. 15
Mathieson Alkali....	.37½	Mar. 8	Apr. 1
Mathieson Alkali, pf.	$1.75	Mar. 8	Apr. 1
Merck Cap., pf.....	$2.00	Mar. 17	Apr. 1
Monroe Chemical pf	.87½	Mar. 10	Apr. 1
Monsanto Chemical.	.31¼	Mar. 10	Apr. 1
National Carbon, pf.	$2.00	Apr. 20	May 1
Nat'l Distillers Prods	.30	Mar. 17	Apr. 1
Nat'l Lead Co......	$1.25	Mar. 17	Mar. 31
Penn. Salt Mfg.....	.75	Mar. 31	Apr. 15
Pittsburg P. Glass...	.15	Mar. 20	Apr. 1
Pratt & Lambert....	.12½	Mar. 15	Apr. 1
Proctor & Gamble 8%, pf...........	$2.00	Mar. 24	Apr. 15
Spencer Kellogg....	.15	Mar. 15	Mar. 31
Union Carbide.....	.25	Mar. 3	Apr. 1
United Dyewood pf.	$1.75	Mar. 31	Apr. 1
U. S. Gypsum......	.25	Mar. 15	Apr. 1
Westvaco Chlorine pf..............	$1.75	Mar. 15	Apr. 1
Will & Baumer pf...	$2.00	Mar. 15	Apr. 1
Young J. S. Co......	$1.50	Mar. 24	Apr. 1
Young J. S. Co., pf..	$1.75	Mar. 24	Apr. 1

Capital Reduction

General Asphalt has made a reduction in stated capital stock from $36,117,030 to $4,100,000 by changing the par value of the capital stock from no par to $10 per share, each present share to be exchangeable for one new share, has been proposed to stockholders in a notice of the annual meeting to be held on April 26.

The proposed reduction in the capital stock would create a balance of $32,000,000 for the surplus to be used in writing down certain assets to current values. Assets now carried on the books at about $21, 350,000 and which were acquired at that value upon the company's organization in 1903 have no corresponding present value because of consolidation, dissolution or otherwise, stockholders were informed.

Reduction in capital of American Home Products to $672,100 from $17,832,438 and change in authorized capital stock from no par to $1 par has been approved by stockholders at a special meeting. Approximately $15,000,000 of surplus so created will be used to write down goodwill trade-marks, formulae, patent rights, etc., to $1.

Over the Counter Prices

	February 28		March 31	
J. T. Baker..........	..	..	..	..
Dixon..............	18	25	24	17
Merck, pfd..........	75	80	75	79
Solid Carb..........	..	..	..	..
Young, J. S. pfd....	75	81	75	81
Young, J. S., com....	35	50	35	50

Foreign Markets

London	February 28	March 31
British Celanese......	6s 3d	6s 6d
Celanese............	28s 9d	35s
Courtaulds..........	£1⅜	£1¼
Distillers...........	53s 9d	53s 9d
Imperial Chemical....	25s 1½d	25s 3d
Un. Molasses........	6s	5s 9d
Paris		
Kuhlmann..........	520	580
L'Air Liquide........	760	880
Berlin		
I. G. Farm..........	108	127
Milan		
Italgas.............	12	11¾
Montecatini.........	112¾	110
Snia Viscosa........	166	153½

Annual Reports Show that——

Tabulation shows number of times interest charges and preferred dividend requirements have been earned in 1932, together with important balance sheet items, as abstracted from annual reports:

	Interest times earned	*Pfd. div. times earned*	*Cash and mark securities*	*Inventories*	*Ratio cur. assets cur. liabil.*	*Working capital*
Barnsdall Corp.:						
Year, December 31, 1932	No fd. dbt.	*....	†$801,684	$2,018,912	1.7	$2,915,649
Year, December 31, 1931	No fd. dbt.	*....	†915,024	3,180,810	1.9	3,692,339
Certain-teed Products:						
Year, December 31, 1932	a........	*....	b$3,101,258	$1,857,482	11.1	$5,558,085
Year, December 31. 1931	a........	*....	b3,313,647	1,826,782	11.2	6,528,089
Colgate-Palmolive-Peet:						
Year, December 31, 1932	No fd. dbt.	0.03	b12,599,619	13,367,817	8.6	31,957,672
Year, December 31, 1931	No fd. dbt.	5.44	b15,257,144	14,659,102	7.3	36,586,254
Corn Products Refining:						
Year, December 31, 1932	117.51	5.00	38,512,049	4,207,332	14.9	46,558,017
Year, December 31, 1931	138.23	6.12	35,462,285	5,715,190	13.7	46,357,497
Penick & Ford:						
Year, December 31, 1932	No fd. dbt.	No pfd.	3,188,223	1,555,894	12.7	4,782,360
Year, December 31, 1931	No fd. dbt.	No pfd.	2,128,004	2,114,598	7.7	4,153,407
Texas Gulf Sulphur:						
Year, December 31, 1932	No fd. dbt.	No pfd.	†2,146,632	14,443,803	20.0	17,280,881
Year, December 31, 1931	No fd. dbt.	No pfd.	†3,477,002	14,192,158	12.7	18,016,293
United Carbon Co.:						
Year, December 31, 1932	No fd. dbt.	c1.15	†509,591	1,425,302	6.0	2,638,315
Year, December 31, 1931	No fd. dbt.	*....	†572,219	1,933,377	3.4	2,466,503
U. S. Industrial Alcohol:						
Year, December 31, 1932	No fd. dbt.	No pfd.	†1,342,935	5,342,392	6.7	6,890,650
Year, December 31, 1931	No fd. dbt.	No pfd.	†2,327,478	4,249,783	14.2	8,724,557

*Loss before dividend requirements.
aLoss before interest changes.
†Cash only.
cAnnual preferred dividend requirements times earned.

Earnings at a Glance

Company	Annual Dividends	Net Income 1932	Net Income 1931	Common Share Earnings 1932	Common Share Earnings 1931
Allied Chem. & Dye:					
Year, Dec. 31......	$6.00	$11,441,189	$18,931,510	$3.62	$6.74
American Cyanamid:					
Year, Dec. 31......	f....	$349,725	*.....	$.14	....
Amer.-Maize Prods:					
Year, Dec. 31......	§1.00	388,345	165,528	1.29	.54
Amer. Zinc, Lead & Smelting:					
Dec. 31 quarter....	f....	†$25,149	*.....	...	...
Year, Dec. 31......	f....	†64,965	$212,445	...	p$2.64
Asbestos Corp.:					
Year, Dec. 31......	f....	†711,377	†879,581	...	...
Barnsdall Corp.:					
Year, Dec. 31......	f....	†847,072	†3,268,637	...	...
Celluloid Corp.:					
Year, Dec. 31......	f....	†399,180	†588,857	...	...
Certain-teed Prods:					
Year, Dec. 31......	f....	†1,600,077	†731,881	...	...
Columbian Carbon:					
Year, Dec. 31......	2.00	954,016	1,628,794	1.77	3.02
Corn Prod. Refining:					
Year, Dec. 31......	3.00	8,761,638	10,709,775	2.77	3.54
Eagle-Picher Lead:					
Year, Dec. 31......	f....	†805,106	†972,846	...	...
General Refractories Co.:					
Year, Dec. 31......	f....	†2,023,137	236,820	...	.79
International Nickel:					
Dec. 31 quarter....	f....	157,008	1,088,640	p0.57%	$.04
Year, Dec. 31......	f....	†135,344	5,094,497	...	.22
Intern'l Printing Ink:					
Year, Dec. 31......	f....	†181,479	†333,214	...	...
Monsanto Chemical:					
Dec. 31 quarter....	1.25	276,656	245,338	h.64	h.57
Year, Dec. 31......	1.25	1,012,698	1,280,782	h2.37	h2.98
Rossville Alcohol:					
Seven mos. Dec. 31..	f....	30,358	......	...	...
Vanadium Corp.:					
Year, Dec. 31......	f....	†1,651,959	†1,096,721	...	...

fNo common dividends.
*Not available.
†Net Loss.
pOn preferred stock.

Monsanto Makes Favorable Report

Monsanto Chemical and subsidiaries for year ended Dec. 31, 1932, (certified by independent auditors) shows net profit of $1,012,698 after depreciation, interest, federal taxes, etc., equivalent to $2.37 a share on 427,197 no-par shares of stock outstanding at close of year. This compares with $1,280,782 or $2.98 a share on 429,000 shares in 1931.

For quarter ended Dec. 31, 1932, net profit was $276,656 after charges and taxes, equal to 64 cents a share on 427,197 shares comparing with $201,821 equal to 47 cents a share on 429,000 shares in preceding quarter and $245,338 or 57 cents a share on 429,000 shares in December quarter of previous year.

Current assets as of Dec. 31, 1932, including $2,566,954 cash and marketable securities, amounted to $6,393,261 and current liabilities were $1,117,591 comparing with cash and marketable securities of $2,206,112, current assets of $5,895,505 and current liabilities of $940,254 at end of preceding year.

Consolidated income account for year 1932, compares as follows:

	1932	1931	1930	1929
Gross profit..............	$3,802,272	$4,296,002	$3,677,771	$5,725,881
Expenses.................	1,217,636	1,320,293	1,484,595	1,584,970
Oper profit............	$2,584,636	$2,975,709	$2,193,176	$3,140,911
Other income............	199,629	189,045	199,875	171,812
Total inc..............	$2,784,265	$3,164,754	$2,393,051	$3,312,723
Depr and obsol..........	943,186	977,008	947,616	815,537
Research................	383,412	463,956	453,148	424,847
Int and disc............	102,059	108,529	112,829	143,616
Fed taxes, etc..........	231,549	171,929	105,076	229,804
Other deduct............	111,361	162,550	41,698	7,581
Net profit............	$1,012,698	$2,280,782	$732,684	$1,691,338
Cash divs...............	533,008	535,273	515,561	382,938
Surplus................	$479,690	$745,509	$217,123	$1,308,400

Spencer Kellogg reports for 24 weeks ended Feb. 11, 1933, net loss of $62,625 after taxes and charges comparing with net loss of $76,256 for the 24 weeks ended February 13, 1932.

Cyanamid Nets 14 Cents a Share

American Cyanamid Co. and subsidiaries for year ended Dec. 31, 1932, (certified by independent auditors) shows consolidated net profit of $349,725 after depreciation, depletion, interest, federal taxes, minority interest, etc., equivalent to 14 cents a share (par $10) on combined 2,470,137 shares of Class A and B common stock outstanding at end of period, including shares reserved for stocks not yet presented for exchange, but excluding 207,905 Class B shares held by subsidiaries. Previous report of company was for 18 months ended Dec. 31, 1931, and showed consolidated net profit of $520,803, equal to 21 cents a share on combined 2,470,159 shares of Class A and B common stocks, including shares reserved for stocks not presented for exchange. Company has changed its fiscal year to end Dec. 31, instead of June 30.

Current assets as of Dec. 31, 1932, including $5,783,506 cash and marketable securities, amounted to $16,457,244 and current liabilities were $2,299,426. This compares with cash and marketable securities of $5,452,137, current assets of $16,975,210 and current liabilities of $2,490,41 at end of preceding year.

Consolidated income account for year ended Dec. 31, 1932, compares as follows:

	Year ended Dec. 31, '32	18 months ended Dec. 31, '31
Operating profit..............................	$3,094,064	$4,338,810
Dividends, interest and disc..................	239,201	523,801
Royalties, licenses, etc......................	41,946	286,186
Other income..................................	78,956	288,168
Total income................................	$3,454,167	$5,436,965
Depreciation and depletion....................	1,551,156	2,262,805
Research, process and mark. dev. exp..........	1,176,028	1,998,629
Interest......................................	289,912	520,994
Federal taxes.................................	3,346	5,036
Minority interest.............................	84,000	128,698
Net profit..................................	$349,725	$520,803

Consolidated balance sheet of American Cyanamid Co. and subsidiaries as of Dec. 31, 1932, compares as follows:

Assets	1932	1931
‡Plant, property and equipment................	$21,346,963	$22,300,220
Cash..	4,283,131	3,499,152
Notes and accounts receivable, etc............	2,863,590	3,315,276
Marketable securities.........................	1,500,375	1,952,985
Inventories...................................	7,810,148	8,207,797
Stock purch. contr. of office and emp.........	1,024,500	1,024,500
Other inv. and advances.......................	1,873,284	1,423,079
Patents and processes, etc....................	5,000,000	5,000,000
Prepaid expenses, etc.........................	464,397	624,027
Goodwill......................................	1	1
Total.......................................	$46,166,389	$47,347,037
Liabilities		
Class A and B stocks..........................	*24,701,370	$24,701,590
Funded debt...................................	5,069,400	5,627,900
Preferred stock called for redemption.........	4,000	4,000
†Trade acceptance, etc........................	278,830	208,548
Accounts payable and accrued liab.............	2,019,439	2,277,548
Federal tax reserve...........................	1,158	4,325
Contg. reserve, etc...........................	1,736,356	2,358,698
Sub. monority interest........................	1,804,252	1,808,362
Earned surplus................................	3,546,130	3,329,409
Paid-in and capital surplus...................	7,005,454	7,026,657
Total.......................................	$46,166,389	$47,347,037

*Represented by 65,943 shares (par $10) of Class A and 2,404,194 shares (par $10) of Class B common stocks, including shares reserved for stocks not yet exchanged, but excluding 207,905 shares of B stock held by subsidiaries. †Includes purchase money obligations. ‡After depletion and depreciation.

Heyden Earnings Close to 1931 Level

Heyden Chemical and subsidiary for year ended Dec. 31, 1932, (certified by independent auditors) shows net profit of $203,600 after interest, depreciation, federal taxes, etc., equivalent after 7% preferred dividend requirements, to $1.21 a share (par $10) on 150,000 shares of common stock. This compares with $243,227 or $1.47 a common share in 1931.

Current assets as of Dec. 31, last, including $252,164 cash and marketable securities, amounted to $841,515 and current liabilities were $164,895. This compares with cash and marketable securities of $253,825, current assets of $836,286 and current liabilities of $161,335 at close of preceding year.

Allied Chemical Net Profit Off Sharply

Allied Chemical and subsidiaries for year ended Dec. 31, 1932, certified by independent auditors, shows net income of $11,441,189, after depreciation, federal taxes, etc., equivalent, after 7% preferred dividends, to $3.62 a share on 2,401,288 no-par shares of common stock. This compares with $18,931,510, or $6.74 a common share in 1931.

Deficit after dividends in 1932 was $5,716,481, against surplus of $1,607,332 in preceding year.

Current assets as of Dec. 31, 1932, amounted to $150,654,699, and current liabilities, including tax reserves, were $8,029,543, comparing with $152,407,823 and $9,340,307, respectively, at end of preceding year. Cash, U. S. government and other marketable securities amounted to $118,287,734, against $114,651,067 at close of 1931. Consolidated income account for year 1932, compares as follows:

	1932	1931	1930	1929
*Gross inc	$12,730,108	$20,779,031	$27,886,685	$33,384,552
Fed tax	1,288,919	1,847,521	2,783,146	3,186,029
Net inc	$11,441,189	$18,931,510	$25,103,539	$30,198,523
Pfd divs	2,749,943	2,749,943	2,749,943	2,749,943
Com divs	14,407,728	14,574,235	13,881,526	13,068,654
Deficit	$5,716,481	†$1,607,332	†$8,472,070	†$14,379,926
Prev. surp	165,169,252	204,133,460	196,205,745	181,825,819
Tot surp	$159,452,771	$205,740,792	$204,677,815	$196,205,745
Stocks divs	....	571,540	544,355	....
Tr to cont res	....	40,000,000	....	....
P & L surp	$159,452,771	$165,169,252	$204,133,460	$196,205,745

*After expenses, depreciation, ordinary taxes, etc. †Surplus.

Assets	1932	1931	1930	1929
R E, plts, eq mines, etc.	$222,990,044	$223,068,894	$219,136,152	$202,315,812
Investments	12,692,510	10,413,770	5,250,453	5,469,076
Cash	25,883,393	20,012,912	20,337,616	20,303,291
Gov and mark secur	92,404,341	94,638,155	92,982,868	92,500,723
Acts and notes rec	9,721,720	11,188,465	13,397,157	16,225,955
Inventories	22,645,245	26,568,292	28,733,695	28,746,078
Pats, gdwl, etc	21,305,943	21,305,942	21,305,942	21,205,942
Def chgs	892,885	853,372	1,090,645	746,643
Total	$408,536,081	$408,049,802	$402,234,528	$387,613,520
Liabilities				
Pfd stock	$39,284,900	$39,284,900	$39,284,900	$39,284,900
Com stock	*12,006,440	*12,006,440	11,434,900	10,890,545
Divs pay	4,289,418	4,289,418	4,117,955	3,954,649
Accts pay	1,827,848	2,541,674	4,270,637	5,148,793
Accrued wages	180,907	163,449	326,463	417,282
Dep res, etc	129,257,567	122,746,940	117,158,292	110,466,603
Gen con res	55,887,867	54,731,268	13,297,384	12,877,610
Tax res	1,731,372	2,345,766	3,357,110	3,753,478
Ins res	2,269,316	2,303,470	2,325,928	2,310,951
Other res	2,347,675	2,467,225	2,527,499	2,302,964
Cap surp	61,752,335	61,752,335	62,323,875	62,868,230
Other surp	97,700,436	103,416,917	141,809,585	133,337,515
Total	$408,536,081	$408,049,802	$402,234,528	$387,613,520

*Represented by 2,401,288 no-par shares carried at $5 per share.

Vanadium Reports Net Loss

Vanadium and subsidiaries for year ended Dec. 31, 1932, (certified by independent auditors) shows net loss of $1,651,959 after depreciation, interest, inventory adjustment, etc., comparing with net loss of $1,096,721 in 1931.

Current assets as of Dec. 31, last, including $906,963 cash and marketable securities, at market value, amounted to $3,944,661 and current liabilities were $318,879. This compares with cash and marketable securities at market value of $1,275,533, current assets of $5,941,644 and current liabilities of $498,700 at close of preceding year.

Consolidated income account for year 1932, compares as follows:

	1932	1931	1930	1929
Net sales	$1,322,876	$2,347,589	....	....
Costs & exp	2,260,463	2,893,294	....	....
Oper loss	$937,587	$545,705	*$981,287	*$2,328,830
Other income	71,305	119,721	†697,091	344,561
Loss	$866,282	$425,984	*$1,678,378	*$2,673,391
Deprec etc	437,773	328,604	512,202	608,448
Federal tax	....	....	49,193	207,630
Interest etc	235,313	192,133	....	....
Loss on sec etc	52,631	....	....	7,427
Invent adj	60,000	150,000	....	....
Net loss	$1,651,959	$1,096,721	*$1,116,983	*$1,849,886
Dividends	....	274,977	1,088,586	1,468,648
Deficit	$1,651,959	$1,371,698	‡$28,397	‡$381,238

*Profit. †Includes profit on resale of company's own stock. ‡Surplus.

Columbian Carbon 1932 Net $954,016

Columbian Carbon and subsidiaries for year ended Dec. 31, 1932, certified by independent auditors, shows net profit of $954,016 after depreciation, depletion, federal taxes, minority interest, etc., equivalent to $1.77 a share on 538,420 no-par shares of capital stock. This compares with $1,628,794 or $3.02 a share in 1931.

Current assets as of Dec. 31, 1932, including $1,264,094 cash, amounted to $7,791,789 and current liabilities were $625,779. This compares with cash of $1,187,041 current assets of $10,129,163 and current liabilities of $980,941 at close of 1931. Consolidated income account for year 1932, compares as follows:

	1932	1931	1930	1929
Net sales	$7,427,290	$9,474,216	$9,756,328	$12,659,484
Cost of sales	3,841,557	4,893,724	4,308,889	4,799,524
Expenses	1,633,803	1,701,758	1,313,524	1,686,170
Oper profit	$1,951,930	$2,878,734	$4,133,915	$6,173,790
Other income	271,920	508,032	452,306	353,444
Total inc	$2,223,850	$3,386,766	$4,586,221	$6,527,234
Other charges	204,247	162,297	169,840	246,223
Minority int	†53,533	†30,528	‡237,062	‡349,825
Depr & depl	1,099,120	1,526,203	1,424,396	1,840,695
Federal tax	20,000	100,000	240,000	425,000
Net profit	$954,016	$1,628,794	$2,514,923	$3,665,491
Dividends	1,338,847	2,614,494	2,936,166	2,286,720
Deficit	$384,831	$985,700	$421,243	*$1,378,771

*Surplus. †Credit. ‡Debit.

Carbide Profit Cut In Half

Union Carbide and subsidiaries for year ended Dec. 31, 1932, certified by independent auditors, shows net income of $8,781,426 after federal taxes, depreciation, depletion, interest and subsidiary preferred dividends, equivalent to 97 cents a share on 9,000,743 no-par shares of stock. This compares with $18,029,522 or $2 a share in 1931.

Current assets as of Dec. 31, 1932, excluding company's capital stock held as investment, amounted to $61,765,031 and current liabilities were $6,596,984. On Dec. 31, 1931, current assets. aggregated $78,404,035 and current liabilities were $11,797,174 Cash and marketable securities at market value, amounted to $11,286,572, against $22,271,932 at end of previous year.

Consolidated income account for year 1932 compares as follows:

	1932	1931	1930	1929
Net after fed tax	$16,865,074	$26,076,680	$37,002,705	$44,126,066
Depr & depl	6,178,425	6,049,658	7,248,526	7,126,762
Other chgs	672,722	737,050	564,406	334,478
Interest	695,823	723,772	611,670	674,802
Sub pfd divs	536,678	536,678	536,678	563,000
Net income	$8,781,426	$18,029,522	$28,041,425	$35,427,024
Dividends	12,601,040	23,401,932	23,395,734	20,736,657
Deficit	$3,819,614	$5,372,410	*$4,645,691	*14,690,367
P & L surp	36,381,724	43,659,274	98,579,703	96,781,281

*Surplus.

Anglo-Chilean Nitrate Annual Statement

Anglo-Chilean Nitrate and subsidiary statement for year ended June 30, 1932 (expressed in U. S. dollars) shows operating income of $2,028,034. Including interest received and after deducting expenses, inventory adjustments, depreciation, interest, amortization and adjustment arising from reduction of investments to market, there was a loss of $4,082,103. After crediting the account with $870,022 discount on bonds and debentures retired and profit on exchange during the year and net adjustments, amounting to $2,905,279, arising from conversion at the rates of exchange in effect at June 30, 1932, of certain assets and liabilities stated in foreign currencies, the loss amounted to $306,802. Total loss after allowing for $1,451,922 payment of 60 Chilean gold pesos per metric ton under decree law 12 of February 24, 1931, for the year was $1,758,724. No deduction has been made for depletion of nitrate reserves. Consolidated balance sheet as of June 30, 1932, shows total assets of $86,425,202. Cash was $53,589 and surplus amounted to $28,355,103. Capital stock consists of 400,000 shares of 100 Chilean pesos each.

The Industry's Securities

1933 March Last	1933 March High	1933 March Low	1933 High	1933 Low	1932 High	1932 Low	Sales In March	Sales During 1933	Stocks	Par $	Shares Listed	An. Rate		Earnings $-per share-$ 1931	Earnings $-per share-$ 1930
NEW YORK STOCK EXCHANGE															
54½	61½	47½	64½	47½	63½	30⅞	53,200	137,000	Air Reduction	No	841,288	$3.00		4.54	6.32
76¾	88¾	70¾	89⅞	70¾	88¼	42½	320,300	767,900	Allied Chem. & Dye	No	2,401,000	6.00		6.74	9.77
118¾	119½	118¼	121⅞	118¼*	120†	96½	600	6,900	7% cum. pfd.	100	393,000	7.00			
10⅞	11¾	7¼	11¾†	7¼*	15½	3½	12,600	20,100	Amer. Agric. Chem.	100	333,000		Yr. Je. '30		Nil
16⅝	17⅝	13	22⅝	13	27	11	26,200	51,100	Amer. Com. Alc. (new)	20	375,000				d1.27
12	14	9¾	14†	9¾*	15½	7	1,800	3,600	Archer Dan. Midland	No	550,000	1.00	Yr. Aug. 30	.59	1.68
11	13⅛	9¾	12¼†	9	25½	7*	4,000	8,300	Atlas Powder Co.	No	261,438				2.67
61	64½	61	66	61	79½	45½	560	1,184	6% cum. pfd.	100	96,000	6.00			
26¼	33⅜	23½	35¾	23⅛	41⅞	13½	37,200	143,600	Columbian Carbon	No	538,420	2.00		3.02	5.04
12⅜	13½	9	13½†	9	13¾	3½	243,400	476,200	Comm. Solvents	No	2,530,000	.60		.83	1.07
53¼	59½	45⅜	59½†	45⅜	55⅜	24¾	105,400	249,100	Corn Products	25	2,530,000	3.00		3.54	4.82
130	131	117½	145¾	117½*	140	99½	240	1,630	7% cum. pfd.	100	250,000	7.00			
½	2	½	4⅞	½*	9¼	1	31,500	100,000	Davison Chem. Co.	No	504,000		Yr. Je. '30		4.00
33⅛	43	32⅛	43†	32⅛*	59¾	22	314,300	728,300	DuPont de Nemours	20	11,008,512	2.00		4.29	4.67
99⅞	103¼	99⅞	106	99⅞	105⅛	80¾	3,200	12,500	6% cum. deb.	100	1,098,831	6.00			
52½	61¼	50⅛	61⅜	50⅛	87¾	35¼	43,900	129,118	Eastman Kodak	No	2,261,000	3.00		5.78	8.84
130	130	120	130†	120	125	99	190	280	6% cum. pfd.	100	62,000	6.00			
21	24½	16⅛	26⅜	16⅛	28⅝	10	29,000	98,700	Freeport Texas Co.	No	730,000	2.00		3.26	w4.77
16¼	20¼	15	20¼†	15	29½	13⅞	3,800	8,000	Hercules Powder Co.	No	606,234	1.50		1.04	2.61
88	94¾	91	95½	87½	95	70½	580	1,390	7% cum. pfd.	100	114,241	7.00			
1½	1¾	1	1¾†	⅞	3½	¼	4,600	5,700	Intern. Agric.	No	450,000		Yr. Je. '30		1.68
6	6½	5	6½†	5	15	3¾	1,000	700	7% cum. prior pfd.	100	100,000	7.00	Yr. Je. '30		14.58
7⅞	9½	6¾	9½†	6¾	12½	3½	301,100	464,600	Intern. Nickel	No	14,584,000			.22	.67
8⅛	9	8	9	8*	11	8	400	1,300	Kellogg (Spencer)	No	598,000	.60			h1.14
15⅜	18½	10¼	18½†	10¼	22	9	48,500	64,200	Liquid Carbonic Corp.	No	342,000			2.96	5.22
15¾	18½	14	18½†	14	20⅞	9	10,500	24,800	Mathieson Alkali	No	650,426	1.50		1.88	2.96
101¼	101¼	101¼	103	100⅛	105	89¾	10	160	7% cum. pfd.	100	24,610	7.00			
29⅛	30⅞	25	31	25*	30¾	13⅜	9,300	22,066	Monsanto Chem.	No	416,000	1.25		2.98	1.73
26	27⅜	19	27⅜†	16⅞	27¼	13	51,400	79,800	National Dist. Prod. cts. (new)	No	252,000			—	1.23
55	60	45½	60	43¼	92	45	700	2,400	National Lead	100	310,000	5.00			7.58
...	104	101	110	101*	125	87	320	2,355	7% cum. "A" pfd.	100	244,000	7.00			
80	80	80	81	75	105	61	100	830	6% cum. "B" pfd.	100	103,000	6.00			
2⅛	3⅛	1⅜	3⅛†	1⅜	4⅜	1	4,200	5,800	Tenn. Corporation	No	857,000	1.00			1.21
17⅞	20	15⅝	25	15¼	26¾	12	64,400	199,400	Texas Gulf Sulphur	No	2,540,000	2.00		3.52	5.50
22⅛	26¾	19⅞	28⅜	19¾	36⅜	15½	154,400	429,600	Union Carbide & Carb.	No	9,001,000	1.20		2.00	3.12
11⅛	14⅜	10⅜	15	10¼	18	6⅝	18,000	65,100	United Carbon Co.	No	398,000			—	1.43
22⅜	22⅜	13½	27¼	13½	36¼	13¼	71,900	137,900	U. S. Ind. Alc. Co.	No	373,846			—	z2.96
10¼	14	7¾	14¼	7⅝*	23¾	5¼	26,800	60,100	Vanadium Corp. of Amer.	No	378,367				2.95
1	1¼	¾	1¼†	⅝	2⅜	½	3,200	7,300	Virginia Caro. Chem.	No	487,000		Yr. Je. '30		Nil
4¼	6¼	3⅜	6¼†	3⅜*	11¼	3⅛	4,100	5,600	6% cum. part. pfd.	100	213,000		Yr. Je. '30		2.63
35⅜	42	35⅜	50½	35⅜*	69¾	20	1,400	2,700	7% cum. prior pfd.	100	145,000		Yr. Je. '30		11.96
7	8	5	8	5*	12⅝	1	1,700	4,600	Westvaco Chlorine Prod.	No		1.00		1.79	2.51
NEW YORK CURB															
5	6¼	3¼	6¼†	3¼	8½	1⅝	48,100	78,500	Amer. Cyanamid "B"	No	2,404,000			.21	
5/16	5/16	5/16	5/16	5/16	⅞	⅛	800	1,100	Anglo-Chilean Nitrate	No	1,757,000		Yr. Je. '30		Nil
...	...	...	...	...	2⅛	¾			Brit. Celanese Am. Rcts.	2.43	2,806,000				
32	36	32	43¾	32*	55	8	500	1,765	Celanese 7% cum. part. 1st pfd.	100	148,000	7.00			
54	57	54	60	54*	64¼	17	300	825	" 7% cum. prior pfd.	100	115,000	7.00			
...	...	...	...	...	5⅜	1⅛			Celluloid Corp.		195,000				
4⅛	4⅞	4⅛	5	4⅛*	6⅞	4½	600	1,200	Courtaulds, Ltd.	1£					
36½	38	30	38†	30*	39	21⅛	800	1,100	Dow Chemical	No	630,000	2.00			3.44
¾	¾	¾	1	½	1½	¼	400	1,100	Duval Texas Sulphur	No	500,000				
...	...	...	10	9¼	...	...		300	Heyden Chemical Corp.	10	150,000	1.00			
...	...	...	...	...	2⅞	2¼			Imperial Chem. Ind.	1£				1.21	
8¼	9⅝	8	11¼	8	20⅞	6¼	1,300	5,400	Shawinigan W. & P.	No	2,178,000	1.00			
¼	½	¼	¾	⅛	3	½	3,300	10,200	Silica Gel Corp.	No	600,000				
CLEVELAND STOCK EXCHANGE															
...	...	...	...	...	25	21¾			Cleve-Cliffs Iron $5 pfd.	No	498,000	5.00		—	11.42
34¾	36½	34¾	36½†	30	40	21½	581	2,412	Dow Chemical Co.	No	630,000	2.00			3.44
...	...	...	...	...	...	...			Dow Chemical Co., pfd.	100	3,000,000	7.00			
110	110	110	122½	110*	...	...	85	246	National Carbon, pfd.	100	5,600,000	7.00			
PHILADELPHIA STOCK EXCHANGE															
25¼	31⅛	25¼	31⅛†	25¼*	40	19⅞	805	1,180	Pennsylvania Salt	50	150,000	3.00	Yr. Je. '30		7.97

1933 March Last	1933 March High	1933 March Low	1933 High	1933 Low	1932 High	1932 Low	Sales In March	Sales During 1933	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE													
78½	78½	70½	80	70½*	80	62	10	53	Amer. Cyan. deb. 5s	1942	5	A. O.	4,554,000
68	78	68	83½	68*	80	54¼	151	846	Amer. I. G. Chem. conv. 5½s	1949	5½	M. N.	29,933,000
2¼	3½	2¼	5½	2¼*	18	1	18	76	Anglo-Chilean s. f. deb. 7s	1945	7	M. N.	14,600,000
37	45	37	46	37*	60	34½	38	86	By-Products Coke Corp. 1st 5½s "A"	1945	5½	M. N.	6,629,000
101½	103⅞	101	104½	101*	104⅞	100⅝	6	91	Corn Prod. Refin. 1st s. f. 5s	1934	5	M. N.	1,822,000
40	42	40	42†	39⅞	54⅞	32	11	36	Int. Agric. Corp. 1st coll. tr. stamped to 1942	1942	5½		
3	4	2½	5	2½*	15¼	¼	145	453	Lautaro Nitrate conv. 6s	1954	6	J. J.	32,000,000
94	94⅛	87¼	98½	87¼*	97¾	67	25	161	Montecatini Min. & Agric. deb 7s with warrants	1937	7	J. J.	8,188,000
49	51½	46½	62	46½*	59	17	21	108	Ruhr chemical s. f. 6s	1948	6	A. O.	3,578,000
92¼	93	87⅛	93	87	90	66	71	201	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
50	51	50	57	50*	66	39	9	51	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000
40	46½	40	48¾	40*	75	30	118	390	Vanadium Corp. conv. 5s	1941	5	A. O.	5,000,000
NEW YORK CURB													
49¾	57	49¾	65	49¾*	76	55	244,000	1,023,000	Shawinigan W. & P. 4½s. "A"	1967	4½	A. O.	35,000,000
57½	61	57	70¾	57*	76	55	135,000	413,000	4½s.; series "B"	1968	4½	M. N.	16,108,000
101	101	101	...	...	103⅛	99	2,000	25,000	Westvaco Chlorine Prod. 5½s	1937	5½	M. S.	1,992,000

h 11 mos. ending Aug. 30 w 13 mos.; z Before inventory adjustment; *New Low; †New High

Chemical Exports and Imports

U. S. Chemical Export Figures for January

Articles	January, 1933 Quantity	January, 1933 Dollars	Six months ending December, 1932 Quantity	Six months ending December, 1932 Dollars
COAL-TAR PRODUCTS		976,485		4,550,455
Benzol ... galls.	808,452	150,880	1,662,750	289,608
Crude coal tar ... bbls.[1]	59,766	139,202	217,846	459,212
Coal-tar pitch ... tons	22,104	274,697	109,222	1,363,277
Creosote oil ... galls.	6,961	1,201	35,726	8,264
Coal-tar colors, dyes, stains, and color lakes ... lbs.	1,000,842	284,302	7,991,499	1,989,078
Other coal-tar products, exclusive of medicinals ... lbs.	3,047,310	126,203	3,673,184	441,016
INDUSTRIAL CHEMICAL SPECIALTIES		612,670		4,678,137
Nicotine sulphate (40% basis) ... lbs.	6,324	4,158	23,490	17,844
Lead arsenate ... lbs.	18,062	1,333	448,709	34,756
Calcium arsenate ... lbs.	229,500	8,458	1,239,923	46,721
Other agricultural insecticides, fungicides, and similar preparations, and materials ... lbs.	360,441	29,770	2,636,092	250,113
Household insecticides and exterminators—				
Liquid ... lbs.	138,427	38,073	960,082	305,506
Powdered or paste ... lbs.	20,695	5,639	128,722	35,603
Household disinfectants, deodorants, germicides, and similar preparations ... lbs.	104,374	9,160	678,265	72,090
Baking powder ... lbs.	193,063	41,530	1,268,005	310,192
Petroleum jelly ... lbs.	699,540	32,749	5,310,956	323,891
Tobacco extracts ... lbs.	38,308	7,456	582,407	83,755
Dextrine or British gum ... lbs.	1,261,548	38,832	4,037,786	145,687
Rubber compounding agents (accelerators, retarders, etc.) ... lbs.	130,227	65,322	706,238	355,214
Cementing preparations, for repairing, sealing, and adhesive use ... lbs.	129,949	20,600	1,257,322	199,649
Textile specialty compounds ... lbs.	933,062	21,413	3,427,766	112,111
Water softeners, purifiers, boiler and feed-water compounds ... lbs.	90,478	10,336	845,466	99,229
Metal-working compounds ... lbs.	37,260	4,175	322,850	45,296
Specialty cleaning and washing compounds (exclusive of soap) ... lbs.	124,939	11,851	568,423	55,784
Polishes—				
Metal and stove polishes ... lbs.	46,380	7,422	337,274	45,133
Shoe polishes and shoe cleaners ... lbs.	66,265	19,533	467,225	117,333
Leather dressings and stains ... lbs.	241,786	29,112	1,547,035	172,993
Floor wax, wood and furniture polishes ... lbs.	47,227	9,215	324,192	64,408
Automobile polishes ... lbs.	17,992	4,560	234,282	57,933
Other chemical specialty compounds, n. e. s.		191,973		1,726,946
INDUSTRIAL CHEMICALS		1,132,521		7,027,210
Acids and anhydrides—				
Organic (exclusive of coal-tar acids) ... lbs.	28,282	4,733	154,474	28,171
Inorganic—				
Hydrochloric (muriatic) ... lbs.	412,840	6,096	1,297,325	23,678
Boric (boracic) ... lbs.	379,208	16,091	1,375,530	61,271
Other inorganic acids and anhydrides ... lbs.	682,162	31,618	4,200,920	144,988
Alcohols—				
Methanol ... galls.	112,122	45,973	468,021	195,660
Butanol (butyl alcohol) ... lbs.	282,894	21,726	822,386	71,844
Other alcohols ... lbs.	91,296	6,698	909,884	75,222
Acetone ... lbs.	345,326	21,562	1,961,139	141,885
Carbon bisulphide ... lbs.	194,014	9,019	1,373,795	64,291
Formaldehyde (formalin) ... lbs.	368,626	16,423	762,391	35,639
Citrate of lime ... lbs.	582,870	37,136	2,731,929	176,309
Other organic chemicals ... lbs.	435,914	70,650	5,546,043	758,023
Nitro or aceto cellulose solutions, collodion, etc. ... lbs.	321,778	54,397	1,094,431	204,249
Aluminum sulphate ... lbs.	3,028,619	30,217	22,243,880	240,135
Other aluminum compounds ... lbs.	54,946	6,361	108,539	9,270
Calcium carbide ... lbs.	81,577	3,335	822,962	32,879
Calcium chloride ... lbs.	470,656	6,313	6,900,680	77,357
Copper sulphate (blue vitriol) ... lbs.	281,571	7,033	1,885,073	48,360
Hydrogen peroxide (or dioxide) ... lbs.	46,195	8,175	279,599	43,455
Potassium compounds (not fertilizers) ... lbs.	106,142	13,151	835,611	105,828
Sodium compounds ... lbs.	32,189,542	520,083	194,730,763	3,237,915
Bichromate and chromate ... lbs.	568,200	31,826	2,876,982	152,260
Cyanide ... lbs.	21,446	3,109	386,654	55,389
Borate (borax) ... lbs.	16,923,829	209,918	79,552,882	1,077,630
Silicate (water glass) ... lbs.	3,131,145	25,365	23,566,867	178,672
Soda ash ... lbs.	1,678,778	29,781	13,971,068	224,295
Sal soda ... lbs.	262,302	3,973	2,700,632	40,253
Bicarbonate (acid soda or baking soda) ... lbs.	1,231,778	20,068	6,794,101	118,987
Hydroxide (caustic soda) in drums ... lbs.	6,710,095	146,246	56,830,759	1,131,989
Sodium phosphate (mono, di, or tri) ... lbs.	565,994	17,556	2,550,630	72,153
Other sodium compounds ... lbs.	1,095,975	32,241	5,500,188	186,287
Tin compounds ... lbs.	5,699	1,515	219,851	34,428
GROUP 8.—Continued.				
INDUSTRIAL CHEMICALS—Continued.				
Gases, compressed, liquefied, and solidified—				
Ammonia, anhydrous ... lbs.	65,547	9,782	309,279	41,726
Chlorine ... lbs.	764,815	18,189	2,886,698	67,567
Other gases, n. e. s. ... lbs.	298,199	18,088	4,110,736	194,492
Other industrial chemicals		148,157		912,568
PIGMENTS, PAINTS, AND VARNISHES		799,893		4,843,729
Mineral-earth pigments—				
Ocher, umber, sienna, and other forms of iron oxide for paints ... lbs.	468,248	8,849	2,878,355	65,640
Other mineral-earth pigments (whiting, barytes, etc.) ... lbs.	393,913	3,211	5,018,341	59,255
Chemical pigments—				
Zinc oxide ... lbs.	79,088	6,402	611,218	56,123
Lithopone ... lbs.	107,758	4,456	2,070,251	83,719
Bone black and lampblack ... lbs.	130,894	6,719	428,618	29,501
Carbon black or gas black ... lbs.	11,695,974	439,022	54,359,360	2,249,404
Red lead ... lbs.	28,754	1,871	608,695	34,394
Litharge ... lbs.	219,851	8,726	1,284,064	54,237
White lead—				
Dry ... lbs.	66,236	2,585	578,171	24,575
In oil ... lbs.	34,400	2,465	416,032	26,756
Other chemical pigments ... lbs.	372,395	41,623	1,907,564	264,471
Bituminous paints, liquid and plastic		10,561		166,498
Paste paint ... lbs.	111,314	14,515	681,837	97,080
Kalsomine or cold-water paints, dry ... lbs.	269,712	13,697	2,182,699	111,856
Nitrocellulose (pyroxylin) lacquers—				
Pigmented ... galls.	23,672	54,960	103,243	275,273
Clear ... galls.	3,800	7,489	35,327	69,667
Thinners for nitrocellulose lacquers ... galls.	16,155	16,249	99,555	100,353
Ready-mixed paints, stains, and enamels ... galls.	72,329	132,120	465,787	898,535
Varnishes (oil or spirit, and liquid driers) ... galls.	23,844	24,373	142,455	176,392
FERTILIZERS AND FERTILIZER MATERIALS ... tons.	56,163	502,309	388,114	4,316,726
Nitrogenous fertilizer materials—				
Ammonium sulphate ... tons.	146	3,745	1,070	25,253
Other nitrogenous chemical materials ... tons.	8,244	176,118	101,779	2,501,180
Nitrogenous organic waste materials ... tons.	439	8,132	5,321	92,357
Phosphatic fertilizer materials—				
Phosphate rock—				
High-grade hard rock ... tons.	2,964	21,292	23,123	151,681
Land pebble ... tons.	40,307	154,470	230,408	1,044,431
Superphosphate ... tons.	752	9,886	15,643	143,725
Other phosphate materials ... tons.	105	7,138	399	23,322
Potassic fertilizer materials ... tons.	2,470	97,949	1,422	55,335
Nitrogenous phosphatic types (concentrated chemical fertilizers) ... tons.	722	22,997	6,409	211,452
Prepared fertilizer mixtures ... tons.	14	582	2,540	67,990
EXPLOSIVES, FUSES, ETC.		81,008		686,958
Explosives—				
Smokeless powder ... lbs.	3,427	2,101	87,271	59,640
Dynamite ... lbs.	248,750	32,351	2,341,360	307,159
Other explosives ... lbs.	40,389	6,246	390,696	112,274
Fuses and blasting caps—				
Safety fuses ... lin. ft.	5,722,600	27,931	28,523,413	136,309
Blasting caps ... No.	548,400	12,379	4,719,300	71,576
SOAP AND TOILET PREPARATIONS		378,666		3,143,526
Soap—				
Medicated ... lbs.	24,506	16,238	134,355	84,912
Toilet or fancy ... lbs.	406,367	47,845	2,510,663	370,046
Laundry ... lbs.	1,154,122	45,458	12,050,635	637,753
Powdered or flaked ... lbs.	32,703	2,447	357,673	28,646
Shaving creams ... lbs.	14,350	6,822	313,084	86,734
Shaving cakes, powders, and sticks ... lbs.	9,092	4,936	209,258	58,583
Other soap ... lbs.	44,953	5,002	389,863	43,656
Scouring soaps, bricks, pastes, and powders ... lbs.	220,025	16,572	1,575,847	130,030
Household washing powders ... lbs.	92,179	6,659	222,060	13,205
Dental creams ... lbs.	81,559	71,716	673,461	542,161
Other dentifrices ... lbs.	24,855	6,937	154,180	56,664
Toilet powders—				
Talcum powder, in packages		31,892		200,009
Face powder		8,840		76,153
Compact		1,882		25,378
Creams, rouges, and other cosmetics—				
Cold creams ... lbs.	19,249	9,855	217,909	106,878
Vanishing creams ... lbs.	16,976	4,167	126,021	47,533
Other creams, lotions, and balms		16,704		105,241
Rouges		4,151		35,522
Lipsticks		5,978		64,945
Other cosmetics		5,585		35,390

Compiled from Monthly Summary of Foreign Trade of tho United States, of the Dept. of Commerce

U. S. Chemical Import Figures for January

ARTICLES	JANUARY, 1933 Quantity	JANUARY, 1933 Dollars	SIX MONTHS ENDING DECEMBER, 1932 Quantity	SIX MONTHS ENDING DECEMBER, 1932 Dollars
GROUP 8.				
COAL-TAR PRODUCTS		683, 782		4, 465, 353
Dead or creosote oil, free ... galls	224, 589	16, 408	10, 840, 560	1, 016, 003
All other crudes, free		50, 971		207, 871
Acids, dut ... lbs	13, 130	5, 245	424, 776	93, 321
All other intermediates, dut ... lbs	95, 088	69, 484	538, 022	389, 777
Colors, dyes, stains, color acids, and color bases, n. e. s., dut ... lbs	451, 910	525, 208	2, 376, 035	2, 585, 917
Coal-tar medicinals, dut ... lbs	1, 565	9, 876	16, 731	69, 766
Other finished products, dut ... lbs	2, 642	6, 590	38, 358	102, 698
MEDICINAL AND PHARMACEUTICAL PREPARATIONS		205, 062		880, 763
Quinine sulphate, free ... ozs	5, 008	2, 286	127, 440	42, 403
Other quinine and alkaloids and salts from cinchona bark, free ... ozs			183, 020	67, 733
Other alkaloids, salts, and derivatives, dut		6, 477		37, 804
Antitoxins, serums, vaccines, etc., and blistering beetles, free				143
Menthol, dut ... lbs	26, 400	49, 865	95, 093	165, 815
Santonin and salts, free ... lbs	11	600	243	14, 306
Other medicinals, dut		27, 658		15, 755
Preparations in capsules, pills, tablets, etc., dut		57, 347		
Other preparations, n. e. s., dut		60, 829		536, 804
INDUSTRIAL CHEMICALS		968, 043		6, 890, 213
Acetylene, butylene, ethylene, and propylene derivatives, dut ... lbs	110, 873	10, 379	182, 084	17, 344
Acids and anhydrides—				
Acetic or pyroligneous, dut ... lbs	2, 674, 680	167, 643	8, 080, 443	506, 189
Arsenious (white arsenic), free ... lbs	2, 241, 081	48, 639	5, 572, 582	143, 516
Formic, dut ... lbs	6, 614	408	103, 047	5, 690
Oxalic, dut ... lbs	26, 201	1, 356	117, 640	5, 580
Sulphuric (oil of vitriol), free ... lbs	11, 923	280	964, 593	7, 365
Tartaric, dut ... lbs	99, 566	13, 840	697, 428	114, 364
All other, free ... lbs	24, 449	479	19, 720	2, 028
All other, dut ... lbs	53, 633	10, 126	588, 899	91, 927
Alcohols, including fusel oil, dut		320		6, 458
Ammonium compounds, n. e. s.—				
Chloride (muriate), dut ... lbs	312, 325	7, 309	2, 178, 169	55, 929
Nitrate, dut ... lbs	587, 800	11, 793	3, 098, 291	64, 109
All other, dut ... lbs	27, 765	1, 919	126, 800	5, 931
Barium compounds, dut ... lbs	131, 191	3, 790	648, 836	12, 293
Calcium compounds, dut ... lbs	62, 046	893	336, 469	5, 606
Cellulose products, n. e. s.—				
Acetate, dut ... lbs			8, 562	6, 115
All other—				
Sheets, more than 3/1000 inch thick, and other forms, dut ... lbs	7, 092	14, 927	92, 489	85, 477
Sheets and strips more than 1 inch wide, not over 3/1000 inch thick, dut ... lbs	2, 983	892	6, 289	7, 316
Cobalt oxide, dut ... lbs	19, 016	14, 954	104, 317	99, 527
Copper sulphate, dut, gross weight ... lbs			41, 821	1, 607
Copper sulphate, dut, copper content ... lbs			10, 346	
Glycerin, crude, dut ... lbs	670, 630	22, 168	2, 911, 191	100, 980
Glycerin, refined, dut ... lbs	110, 677	6, 594	1, 576, 100	88, 883
Iodine, crude, free ... lbs	500	1, 046	470, 492	1, 678, 239
Lime, chlorinated, or bleaching powder, dut ... lbs	85, 392	1, 200	1, 140, 232	33, 603
Magnesium compounds, dut ... lbs	930, 292	10, 839	5, 749, 898	72, 342
Potassium compounds, n. e. s.—				
Carbonate, dut ... lbs	1, 377, 553	53, 768	4, 823, 196	197, 199
Chlorate and perchlorate, dut ... lbs	423, 026	16, 533	5, 617, 749	201, 210
Cream of tartar, dut ... lbs			20, 980	2, 183
Cyanide, free ... lbs			29, 125	9, 984
Hydroxide (caustic), dut ... lbs	315, 947	16, 887	2, 463, 484	125, 457
Argols, tartar, and wine lees, free ... lbs	756, 979	36, 310	10, 748, 249	554, 999
All other, n. e. s., dut ... lbs	152, 813	11, 653	1, 069, 422	72, 062
Sodium compounds, n. e. s.—				
Sulphate (salt cake), free ... tons	6, 210	69, 023	26, 798	311, 732
Sulphate, anhydrous, dut ... tons	159	3, 000		
Chlorate, dut ... lbs	122, 487	4, 533	85, 965	3, 478
Cyanide, free ... lbs	1, 073, 161	82, 670	8, 518, 972	839, 533
Ferrocyanide (yellow prussiate), dut ... lbs	33, 418	2, 837	1, 134, 095	98, 970
Nitrite, dut ... lbs			855	174
Phosphate (except pyrophosphate), dut ... lbs	2, 227	162	25, 767	925
GROUP 8.—Continued.				
Other sodium compounds, n. e. s., free ... lbs	33, 098	493	96, 256	1, 281
Other sodium compounds, n. e. s., dut		39, 350		241, 966
Radium salts, free ... grains	24	77, 315	30	107, 370
Other industrial chemicals, free		118, 370		250, 651
Other industrial chemicals, dut		83, 344		652, 631
PIGMENTS, PAINTS, AND VARNISHES		79, 104		647, 847
Mineral earth pigments—				
Iron oxide and iron hydroxide, dut ... lbs	405, 202	5, 233	4, 351, 806	77, 460
Ochers and siennas, dut ... lbs	586, 798	7, 260	3, 651, 685	46, 900
Other mineral earth pigments, dut		15, 679		129, 123
PIGMENTS, PAINTS, AND VARNISHES—Continued.				
Chemical pigments—				
Lithopone and zinc pigments, n. e. s., dut ... lbs	280, 000	6, 904	3, 288, 685	92, 833
Zinc oxide and leaded zinc oxide, dut ... lbs	443, 095	19, 831	2, 390, 633	103, 140
Other chemical pigments, dut ... lbs	51, 959	5, 469	1, 329, 912	62, 936
Paints, stains, and enamels, dut		18, 517		120, 398
Varnishes, dut ... galls	48	211	10, 928	15, 057
FERTILIZERS AND MATERIALS ... tons	92, 712	1, 651, 279	410, 391	8, 188, 168
Nitrogenous—				
Ammonium sulphate, free ... tons	38, 644	599, 406	141, 870	2, 201, 389
Ammonium sulphate-nitrate, free ... tons				
Calcium cyanamide, or lime nitrogen, free ... tons	9, 461	227, 869	27, 855	770, 121
Calcium nitrate, free ... tons	3, 334	57, 246	3, 155	53, 784
Guano, free ... tons	320	3, 568	20, 970	436, 881
Dried blood, free ... tons	128	3, 490	1, 285	26, 439
Sodium nitrate, free ... tons	405	11, 831	5, 476	134, 514
Urea and calurea, free ... tons	381	26, 143	1, 078	92, 175
Other nitrogenous, free ... tons	1, 007	16, 669	8, 091	119, 937
Phosphates—				
Bone ash, dust, and meal, and animal carbon fertilizers, free ... tons	2, 457	42, 116	13, 532	216, 581
Other phosphates, free ... tons	3, 499	31, 750	16, 589	139, 001
Potash fertilizers—				
Chloride, crude, free ... tons	6, 751	240, 619	47, 808	1, 678, 049
Kainite, free ... tons	6, 687	62, 861	17, 299	162, 360
Manure salts, free ... tons	9, 133	102, 177	53, 203	648, 358
Sulphate, crude, free ... tons	2, 045	81, 610	18, 591	778, 904
Nitrate, crude (saltpeter), free ... tons	349	19, 249	5, 613	231, 549
Other potash-bearing substances, free ... tons	3	18	61	402
Fertilizer compounds, containing nitrogen, phosphoric acid, and potash, free ... tons	544	21, 430	2, 348	130, 432
All other, free ... tons	7, 564	103, 227	25, 567	367, 292
EXPLOSIVES		2, 195		43, 388
Powder and other explosives, n. e. s., free ... lbs				
Powder and other explosives, n. e. s., dut				336
Firecrackers, dut ... lbs	7, 510	834	300, 595	32, 951
Fireworks and ammunition, dut		1, 361		10, 101
SOAP AND TOILET PREPARATIONS		109, 997		921, 441
Soap—				
Castile, dut ... lbs	168, 697	12, 786	781, 103	58, 800
Toilet, dut ... lbs	31, 412	8, 691	774, 312	192, 742
All other, dut ... lbs	89, 412	6, 873	962, 053	63, 629
Perfume materials, free ... lbs	647	12, 321	2, 026	98, 433
Perfume materials, dut		34, 108		238, 602
Perfumery, bay rum, and toilet water, dut		13, 359		155, 626
Bath salts, dut ... lbs	176	116	12, 234	1, 401
Cosmetics, powders, creams, etc., dut		21, 743		112, 208
ARTICLES IN GROUP 8, ORDINARILY DUTIABLE, IMPORTED FREE		104		29, 382

Export and Import Statistics

The total value of domestic merchandise exported in January amounted to $118,600,168 compared with total value of general imports of merchandise of $95,993,705. Exports in the chemicals and related products group amounted to $5,286,170 and imports to $3,699,566. For the six months ending December 1932 these figures are $33,867,366 and $22,066,555. Exports during that period exceeded imports by $11,800,811.

Comparison of December 1932 and January 1933 figures show further declines in foreign trade. Only in chemical imports did an increase appear in such a comparison, January total exceeding December by a slight amount.

	December, 1932	*January, 1933*
Total exports	$129,056,731	$118,600,168
Total imports	97,058,870	95,993,705
Chemicals, exports	6,169,970	5,286,170
Chemicals, imports	3,258,780	3,699,566

The Trend of Prices

State of Business

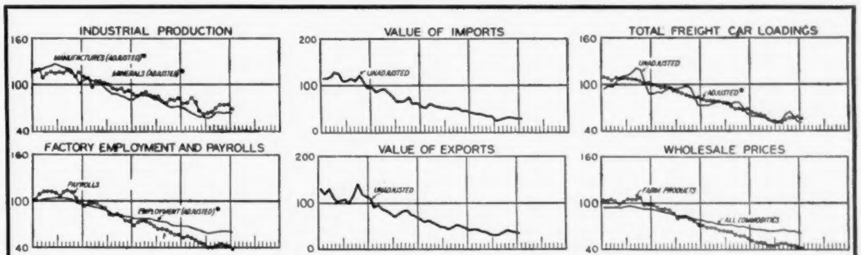
Says the *Financial Chronicle* April 1 in an introduction to its weekly review of the business situation: "Few months in our country's history have been as epoch-making as March, 1933, and probably never since our transition from an agricultural to an industrial state has such a gamut been run from paralyzing fear to renewed hope and encouragement."

Business conditions while far from normal, were as the month closed remarkably stable considering the unprecedented happenings of the 30 day period. Business psychology has changed for the better. In place of the chaotic conditions existing as the month opened, there is optimism and a feeling of relief. Within three weeks the banking situation has been largely corrected, the country has seen real steps made towards balancing the federal budget, a new industry has been created, and the country has been united in a determined effort to lift itself by the bootstraps out of the slough of despondency and despair, uncertainty and chaos of the past six months.

Indices of Business

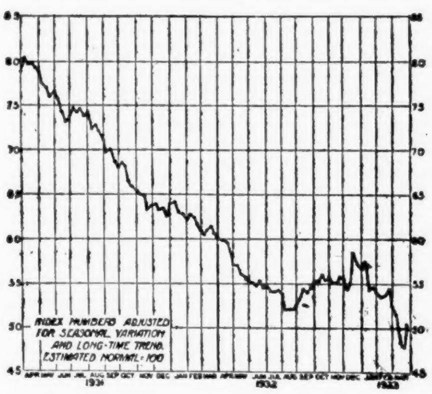
	Latest Available Month	Previous Month	Year Ago
Automobile Production, Feb.	6,286	6,787	6,566
–†Brokers Loans, Mar. 29	$371	$398	$525
*Building Contracts, Feb.	$52,712	$83,356	$89,045
–*Car Loadings, Mar. 25.	475	449	561
†Commercial Paper, Mar. 28	$84	$84	$103
–†Elec. output, kwh, Mar. 25.	1,409	1,375	1,514
Payrolls, Jan.	39	41	52
Failures, Dun, Feb.	2,378	2,919	2,732
*Merchandise Imports, Feb.	$83,000	$96,000	$130,999
*Merchandise Exports, Feb.	$100,000	$120,000	$153,972
Furnaces in Blast, Mar. 1	15.8	15.8	22.8
*Steel Orders, Feb. 28	1,854	1,898	2,545

*000 omitted. †000,000 omitted. –Weeks, not months.



Business indicators, Department of Commerce. The weekly average 1923-25 inclusive=100.

N. Y. Times Index of Business Activity



Retail business picked up again quite smartly in most sections of the country, once the uncertainty and the restrictions on banking were removed. This was attributed partly to seasonal demand and partly from the pent-up necessity for replacement of various kinds of goods. Wholesale trade was brisk as the month closed. Retail stocks are at a minimum, and even a slight flurry of buying is now felt in wholesalers' orders.

Heavy industries continued slow. Steel activity closed at around 13 per cent. The badly muddled financial situation in Detroit helped to prevent any sizable improvement in automotive manufacturing operations, but sales of cars picked up seasonally throughout the country, and producers are now ready to increase operations. The textile industry, outstanding for months in the business picture, slumped somewhat in the past few weeks. Rayon manufacturers cut production schedules, and, as the month closed, instituted a new price cut. The tanning industry in the Peabody section was handicapped by strikes. Building is showing definite signs of improvement, due largely to the return of legal beer. Carloadings increased each week of the month, but the totals were considerably below those for the corresponding periods of last year. Commodities, with but very few exceptions, were stronger as the month closed compared with the end of February, but like the stock market the peak for the month was reached shortly after the end of the bank holiday with slow tapering off in both prices and trading volume.

Business Activity

The *N. Y. Times* Index of Business Activity reflects the severity of the business decline, the result of the financial panic. The index made a new low early in the month, going even lower than the July 1932 figure. In the weeks March 11-25 the index again started upward. Automotive production, carloadings, and electric power advanced while steel and cotton mill activity declined.

Following table gives combined index and its components, each of which is adjusted for seasonal variations and where necessary for long-time trend:

	Week Ended Mar. 25, 1933	Week Ended Mar. 18, 1933
Frght car load	50.6	47.8
Steel mill act	14.6	15.2
Elec. pur. power	62.8	60.8
Auto prod.	19.9	10.8
Card. cott. cloth	90.9	92.7
Combined	50.4	47.9

	Week Ended Mar. 11, 1933	Week Ended Mar. 4, 1933	Mar. 26, 1932
Frght car load	46.6	50.5	60.7
Steel mill act	15.9	16.5	26.0
Elec. pur. power	61.0	62.3	72.3
Auto prod.	17.9	32.6	35.0
Card. cott. cloth	98.3	96.5	90.0
Combined	48.4	51.5	60.5

Declines

Shipments of chemicals declined sharply in March. Usually one of the two best months of the year in volume, producers were generally of the opinion that this tonnage was not lost, but merely delayed, and that April and May would find consumers placing fair sized orders. With the end of the bank holiday improvement set in, but at a very modest pace. Conditions in certain of the industries prevented an immediate pick-up. A strike in certain of the tanning sections, a cut in tire prices, receivership for one of the largest paper companies, curtailment in textile and rayon fields, the banking condition in Detroit, were among the adverse factors that influenced buyers. On the other hand, several of the bottle companies were quite active, an improvement in paint production finally got under way and seasonal items were in fairly good demand.

The trend of prices likewise reflected the grave uncertainties of the month. Quotations on a number of products, particularly those imported, rose sharply with the declaration of the banking moratorium. Spot stocks were quoted generally at much higher figures, but offsetting this, trading was extremely light. Without banking facilities quotations were largely nominal. With the return of more normal conditions prices were again lower in most instances.

Outstanding was the announcement of alcohol producers that prices for the second quarter would be unchanged from those prevailing in the first three months. Benzol was advanced 2c as demand continued to prevent any accumulation of stocks, and, in some instances, actual shortages were reported as steel operations dropped to a new low of 11 per cent. Lead pigments were higher early in the month when the lead market firmed, but these quotations were withdrawn towards close of the 30 day period. Naval store prices rose sharply with the closing of the banks, but gradually lost the best part of the advance later. Most of the fertilizer ammoniates were higher. Mercury prices turned very bullish. One or two grades of shellac were reduced. Oils and fats generally held at least part of their early gains. Under the severest test this country has ever been called upon to undergo business showed in March remarkable recuperative powers.

Acid Acetic — The anticipated curtailment in rayon production for March was much greater because of the banking situation with the result that acid shipments were considerably below the figure for the previous month. In addition most of the other consuming industries were slow. Prices, however, were fairly well maintained throughout the month.

Acid Chromic — The complicated situation in Detroit, the receivership proceedings at South Bend, and the uncertainty surrounding Willys-Overland production schedules held down purchasing to a minimum.

Acid Hydrocyanic — Inquiries for spring fumigation purposes were in greater number.

Acid Sulfuric — The decline in steel operations increased surplus stocks slightly. Offsetting this, the fertilizer industry showed signs of seasonal improvement. The market was rather firm, however, and in most sections prices were well maintained.

Production of sulfuric acid by manufacturers of superphosphate in January 114, 618 short tons, according to a report of the Bureau of Census based on data received from 71 manufacturers operating 99 plants. This compared with 119,350 tons in December and 117,613 tons in January, 1932. Stocks on hand at the end of January were 106,045 tons, against 104,277 tons in December and 93,882 tons at the end of January, 1932. Details of production, consumption and stocks on hand for January, a comparison with December and January, 1932, follow:—

	Short tons*		
	1933	*1932*	
	January	*Jaunary*	*December*
Prod. & purch.—			
Produced—			
Total	114,618	117,613	119,350
N. dist.	69,174	73,636	67,433
S. dist.	45,444	43,977	51,917
Purch. from fert. mfrs.—			
Total	13,472	15,865	17,583
N. dist.	7,226	8,567	10,068
S. dist.	6,246	7,298	7,515
Purchased from non-fertilizer mfrs.—			
Total	15,002	14,554	9,830
N. dist.	10,863	9,533	4,184
S. dist.	4,139	5,021	5,646
Consumed in fertilizer and shipments—			
Consumed by reporting in prod. of fertilizer—			
Total	100,145	95,681	102,886
N. dist.	52,406	54,256	49,287
S. dist.	47,739	41,425	53,599
Shipments—			
To other than fertilizer mfrs—			
Total	26,538	25,657	24,363
N. dist.	24,060	20,155	21,638
S. dist.	2,478	5,502	2,725
To fertilizer mfrs.—			
Total	14,641	27,850	15,284
N. dist.	9,424	19,362	7,652
S. dist.	5,217	8,488	7,632
Stocks on hand—			
Total	106,045	93,882	104,277
N. dist.	80,493	68,632	79,120
S. dist.	25,552	25,250	25,157

*Northern district, States north of Virginia-North Carolina line; Southern district, States south of Virginia-North Carolina line.
†Data not available.

Alcohol — Producers announced during the month that the schedule for the first quarter would be repeated for the second three months' period. Actual sales are only fair, but the industry is worked up over the possibility of federal and state legislation requiring an alcohol content in motor fuel mixtures. Such action is likely to have a profound influence on the industry. Quotations for denatured alcohol to be delivered during the period April 1 to June 30, 1933, are as follows:—

	Cents per gallon
*C. D. No. 5 drums, car lots	38.5
5 to 9 drums	44.5
1 to 4 drums	46.5
S. D. No. 1 tanks	30.4
drums, car lots	34.6
5 to 19 drums	40.6
20 drums	36.6
1 to 4 drums	42.6
barrels, car lots	37.6
5 to 19 barrels	43.6
1 to 4 barrels	45.6

*Credit of 1c per gallon given on purchases of car lots or more.

Ammonia, Aqua — A slight tapering off was reported in certain of the textile finishing centers. Generally speaking, however, the call was fair and producers reported prices firm.

Ammonia, Anhydrous — Already some seasonal pick-up in the demand was in evidence. The firm price structure remains unchanged.

Ammonium Sulfate — Some improvement was noted in the last week of the month both in the number of orders and inquiries, but, as yet, the volume is not very large. Prices were stronger in the spot market. Imported material for May shipment was offered by first hands at $20 per ton, c.i.f. ports. Domestic was offered at $21 to $22 per ton, basis ex-vessel at ports, in bulk, although it was still reported that $20 per ton had been quoted on a port basis for delivery to interior points. February output of sulfate, or its equivalent, as estimated from the domestic operation of by-product coke ovens, was 27,821 tons, compared with 30,278 tons in January and 33,864 tons in February. February imports of sulfate were 42,624 tons against 38,644 tons in January and 19,232 tons in February, 1932. New supply of sulfate in the first two months of this year, as represented by the sum of imports and estimated domestic production, was 193,367 tons. Passage of Administration's farm bill, it has been expected in some quarters, would tend to stimulate production on the part of farmers anticipating higher prices. Fertilizer sales are watched as one indication of such a tendency. New Orleans Cotton Exchange reports fertilizer sales in 10 cotton States were higher in March than for the same month a year ago. This is the first time in several years that March sales have exceeded the year before. Seasonal spurt in sales occurs in the months of March, April and May, and indications are that the increase over 1932 will be maintained.

Fertilizer Tag Sales

	February		
	P.C. of 1932	*1933*	*1932*
South—			
Virginia	74	48,930	66,501
North Carolina	104	78,451	75,521
South Carolina†	82	49,068	59,859
Georgia	66	33,748	51,117
Florida†	88	35,928	40,650
Alabama	111	20,100	18,100
Mississippi	46	7,850	16,933
Tennessee†	78	6,842	8,785
Arkansas‡	71	3,600	5,100
Louisiana†	75	5,300	7,104
Texas	54	5,360	9,955
Oklahoma	49	1,050	2,160
Total South	82	296,227	361,755
Midwest—			
Indiana	62	3,700	6,006
Illinois	146	1,716	1,172
Kentucky	105	7,327	6,976
Missouri	40	2,333	5,815
Kansas	10	105	1,080
Total Midwest	72	15,181	21,049
Grand total	81	311,408	382,804

*Monthly records of fertilizer tags are kept by State Control officials and are slightly larger or smaller than the actual sales of fertilizer. The figures indicate the equivalent number of short tons of fertilizer represented by the tax tags purchased and required by law to be attached to each bag of fertilizer sold in the various States.
†Cottonseed meal sold as fertilizer included.
‡Excludes 13,220 tons of cottonseed meal for January-February combined, but no separation is available for the amount of meal used as fertilizer from that used as feed.

Benzol — Real scarcity of stocks, further curtailment in coking operations and unusual demand for export caused leading producers to advance prices 2c a gallon. Benzol production in February dropped 7.8 per cent., with an output of 3,687,535 gallons as against 3,988,919 gallons in January, and 4,686,000 gallons in February a year ago. Output for the first two months of the current year of benzol as estimated from the production of coke at the by-product plants known to recover benzol, amounted to 7,686,454 gallons, as compared with 9,535,000 gallons in the corresponding period 1932. The average daily production of by-product coke in February was 58,529 net tons, or 1.7 per cent. over that for January. This gain was accounted for by the furnace plants, whose daily average was 4.4 per cent. higher than the January rate; merchants plants, on the other hand, produced 1.1 per cent. less per day than during January. Stocks at by-product plants decreased from 3,308,321 tons to 2,831,248 tons, or 14.4 per cent., and were at the lowest point since March, 1931.

Calcium Chloride — Inquiries for dust-laying tonnages were more numerous. Producers were looking forward too to a pick-up in volume for initial charges in breweries. Prices were firmly adhered to.

Carbon Black — Akron shipments were poor during the entire month, and the cut in tire prices had a bad effect on the sentiment in the rubber trade. Buying for the account of the paint and ink trades was in slightly better volume.

Carbon Tetrachloride — Demand was but routine with prices quite steady.

Carnauba — Prices fluctuated rather widely during the bank holiday, due to the uncertainty as to whether or not the administration would embark on a policy of inflation. With the sound currency program firmly established, prices weakened. As the month closed trading and even inquiries were light. Prices as the month ended were as follows:

	No. 1 Cents	*No. 2 Cents*	*No. 3 Cents*	*No. 4 Cents*	*No. 5 Cents*
No. 1 yellow...	21	21	21	21½	22½
No. 2 yellow...	20	None	20	20½	21½
No. 2 N. C.....	None	14½	None	None	None
No. 3 N. C.....	11¾	11¾	11½	11¾	12½
No. 3 chalky...	12	12	11½	12	12¾

Chlorine — A slight falling off in total volume of shipments for the textile industry featured the market. Price structure has been steady for several months.

Copperas — Although volume was lower the firm price position of this item remained unchanged as the decline in steel operations more than compensated for any possible slack.

Copper Sulfate — Leading producers report that the seasonal increase so far has been quite satisfactory, and, despite the decline of copper to 5c, blue vitriol quotations were firm and unchanged.

Cresol — Disinfectant trade came into the market in greater numbers in the last 10 days of the month.

Cresylic Acid — Hand-to-mouth buying continued to be the predominating influence in this market. No price changes were made.

Dextrin — Several of the grades were advanced 15c to compensate for the advance in grain prices and the better demand.

Formaldehyde — Fair rate of consumption and the lack of unwieldy surpluses aided in maintaining firm undertone in this market.

Glycerin — Prices were slightly steadier in the past month. This was particularly noticeable in the Chicago market. Opinions are divided as to the possible future trend of prices. Some insist that inflation is inevitable, and others are just as insistant that no appreciable inflation will take place. Glycerin imports into Canada dropped from 3,874,735 lbs., valued at $287,454, in 1931 to 315,657 lbs. valued at $23,502 in 1932. Imports from the U. S. increased from 37,939 lbs. to 40,712 lbs.; those from the United Kingdom decreased from 683,250 lbs. to 79,309 lbs.

Intermediates — Chief interest centered in anthranilic, salicylic, and sulfanlic. Demand was also good for aniline. Trading in betanaphthol and dinitrobenzene was in small quantities.

Lead Pigments — No improvement in demand was apparent in March. Early in the month all pigments were increased ¼c with the advance in lead after the end of the bank holiday period, but subsequently, these prices were withdrawn and the ¼c increase rescinded. Lead stocks in U. S. at end of February totaled 189,751 short tons, against 184,693 tons at end of January and 166,425 tons at end of February, 1932. Production in February came to 22,410 tons, against 27,568 tons in January and 32,666 tons in February, 1932. Shipments in February were 17,349 tons, against 19,030 tons in January and 26,812 tons in February, 1932. Of the total production of lead in February, 1933, of 22,410 short tons, 20,033 tons came from domestic ores and 2,377 tons from foreign ores and scrap. This compares with 24,615 tons in January from domestic ores and 2,953 from foreign ores and secondaries. In December 21,175 tons were from domestic and 3,624 tons from foreign ores and scrap. In February last year 28,081 tons were from domestic ores and 4,585 tons from foreign ores and secondaries.

Mercury — A much firmer tone has appeared in the market in the past month or six weeks, and prices closed at $54.50 to $55.50 a flask. It is thought that further increases will be prevented by offerings of foreign material in 100 flask lots at $55.00 laid down in N. Y. City. San Francisco market was firm.

Methanol — Most consuming industries sharply curtailed operations in March and from the tonnage viewpoint the month was disapppointing to producers of both synthetic and wood distilled. Despite this, however, prices were fairly well maintained. Monthly statistics on production, shipment, and stocks of methanol and acetate of lime, based on data reported to the Bureau of the Census by 34 establishments, are presented in the table below:—

Methanol

	Gallons 1932 *January*	1932 *December**	1933 *January*
Refined—			
Wood dist.—			
Production..	180,502	173,636	165,860
Shipments...	112,053	196,786	59,546
Stocks......	217,899	218,175	324,489
Synthetic—			
Production..	585,880	643,598	352,748
Shipments...	386,883	587,406	512,781
Stocks......	2,077,604	3,210,674	3,050,641
Crude—			
Production..	209,475	303,026	312,481
Shipments...	†......	347,860	244,185
Stocks......	404,375	228,867	297,163
Acetate of Lime		*Pounds*	
Production.....	2,493,887	4,465,930	4,741,827
Shipments......	2,998,845	2,061,918	1,713,308
Stocks.........	9,323,890	7,133,819	10,162,338
Wood		*Cords*	
Consumption...	21,867	31,425	30,642
Stocks.........	322,027	283,448	226,194
		Cords per day	
Total capacity..	2,472	2,609	2,609
Total oper...	1,678	1,626	1,626
Shut down...	794	983	983

*Revised. †Data not available.

Naphthalene — Buying for industrial purposes was only routine. A fair amount of buying was reported in flake and ball material for packaging. Prices were held at established levels.

Naval Stores — With the advent of bank holidays active trading in the primary centers stopped. Unofficial quotations in all market centers rose rapidly in the face of very light trading. With the return of more normal conditions prices slumped off somewhat, but at that they closed for the month with a net gain. Statistics reveal the important fact that export trade has been the great backbone of the industry this past year. Commenting on this *Savannah Weekly Naval Stores Review* (March 25) states: "The manner in which the foreign trade has held up has been rather astounding to the exporters. The total foreign rosin movement for the eleven months of April-February was only 27,000 barrels less than last year for those months, a decrease of less than three per cent. If the American naval stores crop this year, as some are inclined to believe, has reached 400,000 barrels of turpentine, with 1,332,000 barrels of rosin, then the foreign demand has for eleven months taken up 76 per cent. of the total crop, and with March shipments to add it would seem that the total foreign movement for the season may run considerably over 80 per cent. of the total production for the year ending March 31st, 1933. While turpentine has not done as well the exports have also measured up in what is regarded as a very satisfactory way, showing a decrease for the eleven months of 10 per cent. The following statement will be of interest in this connection:"

Exports for February

Year	*Spts. Turp. (Bbls. 50 gals.)*	*Rosin (Bbls. 500 lbs.)*
1933...............	11,606	99,607
1932...............	12,351	66,667
1931...............	6,636	44,195
1930...............	14,225	70,296
1929...............	10,887	91,957

Exports April-February

Year	*Spts. Turp. (Bbls. 50 gals.)*	*Rosins (Bbls. 500 lbs.)*
1932-33............	216,982	1,011,793
1931-32............	241,713	1,038,950
1930-31............	399,507	1,132,303
1929-30............	331,013	1,280,354
1928-29............	261,064	1,147,360

Nickel Salt — No appreciable improvement in the volume of plating business took place in March. Automotive production schedules continued to be of very modest proportions.

Nitrogenous Material — All of the organic ammoniates were higher during the past month. Stocks are not large and increase in buying sent quotations up wards.

Petroleum Solvents, Thinners — Trading was light in most districts. Prices were unchanged from the levels reached in mid-February. Interest centered largely in the government's attitude towards oil conservation.

Phenol — Although the demand from dyestuff producers declined during the

month and shipments into the plastics field were poor a firm undertone continued to feature the market for this product. As in the case with benzol demands of the export market have been largely responsible for the present situation. Coking coal charged in by-product ovens in February amounted to 2,370,763 tons as against 2,580,133 tons in January and 2,885,700 tons in February last year. Production of light oils in February amounted to 7,254,535 gallons as compared with 7,895,206 gallons in January and 8,830,262 gallons in February a year ago. Tar recovered totaled 21,911,019 gallons in February as against 23,737,223 gallons in January and 26,548,440 gallons in February last year. Output of ammonia sulfate or its equivalent in February reached 27,821 tons contrasted with 30,278 tons in January and 33,864 tons in February, 1932. Stocks at by-product plants decreased from 3,308,231 tons, or 14.4 per cent. and were the lowest since March, 1931.

Phosphates — Steamed and raw bone went higher in the Chicago market. On the other hand, the superphosphate market continued soft and quotations were subject to shading on fair sized tonnage. Production of bulk superphosphates in November, as reported to the Bureau of Census by 87 manufacturers operating 158 plants, totaled 211,070 short tons, against 150,018 tons in October and 179,405 tons in November, 1931. Production of base and mixed goods in November was 8,792 tons, against 7,376 tons in the preceding month and 4,665 tons in the corresponding month of 1931. Stocks of bulk material on hand at the end of November were 980,033 tons, against 874,042 tons at the close of October, and 1,272,731 tons at the close of November a year ago.

	Short tons	
	1932 [1] *November*	*1932* [2] *October*
Prod. and receipts—		
Production—		
Bulk superphosphates—		
Total U. S.	211,070	150,018
N. district	104,413	71,857
S. district	106,657	78,161
Based & mixed goods—		
Total U. S.	8,792	7,376
N. district	2,369	1,839
S. district	6,423	5,537
Received from other acidulators (including inter-company transfers) [3]—		
Total U. S.	15,069	13,061
N. district	9,053	6,537
S. district	6,016	6,524
Shipments—		
Bulk superphosphates—		
Total U. S.	56,859	108,734
N. district	37,592	70,247
S. district	19,267	38,487
To mixers—		
Total U. S.	32,119	48,172
N. district	23,271	34,801
S. district	8,848	13,371
To other acidulators (including inter-company transfers)—		
Total U. S.	11,717	13,224
N. district	7,559	4,663
S. district	4,158	8,561
To consumers—		
Total U. S.	13,023	47,338
N. district	6,762	30,783
S. district	6,261	16,555
Base & mixed goods—		
Total U. S.	19,090	42,886
N. district	4,710	24,845
S. district	14,380	18,041
Stocks on hand—		
Bulk superphosphate—		
Total U. S.	980,033	874,042
N. district	411,250	368,710
S. district	568,783	505,332
Base & mixed goods—		
Total U. S.	292,206	240,358
N. district	125,075	94,376
S. district	167,131	145,982

[1]Preliminary.
[2]Revised.
[3]Includes both bulk superphosphates and base and mixed goods.

Potash — Suppliers of Californian muriate increased the discount rate during the past month. California muriate is now available on spot at a discount of 4½ per cent from list prices and contract discounts are 10½ per cent and 8½ per cent., according to the quantity of the total contract tonnage which remains undelivered. Muriate from New Mexico continued at a discount of 5½ per cent. on spot and 10½ per cent. on contract in European potash continued unchanged and as yet the importers have not determined what measures will be taken, in any, to meet the increase in the aforementioned discount on California muriate. Officials of the Franco-German syndicate arrived in N. Y. City in late March to confer with leading fertilizer manufacturers.

Saltcake — Producers reported better call from both the glass and paper manufacturers.

Shellac — Business remained dull in this item and prices were weak. Future trend is uncertain. Usually this is a period of heavy activity, but in most quarters it is thought that the volume will be off considerably this year from the 1932 figures. Prices in the primary markets, according to late cable advices, were slightly lower in the last week of the month after considerable strength in the first part of the 30 day period.

Soda Ash — Volume of business in March was, of course, severely affected by the banking crisis. Towards the close of the month a slight improvement occurred, but many buyers were anxious to close the first quarter with small inventories and purchasing was limited largely to small quantities. Carlot prices were firm, but in certain sections keen competition brought about some "shading" on l. c. l. business.

Soda Caustic — Petroleum refiners were said to be ordering out very cautiously. Both the soap and textile industries were likewise buying only for immediate needs. Prices were quite firm in both the c.l. and l.c.l. markets.

Sodium Bichromate — Shipments were affected somewhat by the strike in the Peabody and adjacent tanning centers, but color producers and other consumers increased purchases slightly so that the volume for the month compared favorably with February shipments.

Sodium Chlorate — Seasonal expansion in orders and inquiries was reported. In February 11,023 pounds were imported.

Sodium Cyanide — Both the case-hardening and electroplating industries were extremely quiet with the result that demand for chemicals was poor. Of February imports of 931,539 lbs., France shipped 28,300 lbs.; Germany, 262,964 lbs., and Canada, 640,285 lbs.

Sodium Metasilicate — Shipments for the laundry trade were reported as being only in fair volume. Prices were fairly well maintained.

Sodium Nitrate — Seasonal improvement was slow, but steady and with the improvement in sentiment in the agricultural sections over the administrations farm relief plans the outlook for larger sales seemed better. Chief interest in nitrate centered, of course, in the Chilean-Cosach controversy over the collection of the tax for the interest on the Cosach bonds. (Situation is reviewed in detail in the Foreign News Section). Meanwhile published prices were unchanged throughout the month, and the market tone was one of firmness. February imports amounted to only 2,647 tons.

Sodium Phosphate — Silk-weighting operations were quite irregular during the past month and tonnages of di-salt declined sharply. The highly competitive situation in the tri-salt remained unchanged.

Sodium Silicofluoride — A slight trimming in prices took place last month, some producers advancing quotations to 5¾c.

Tin Salts — The general rise in commodity prices boosted Straits quotations, and producers advanced all salts proportionately. The competition for the limited amount of business available in the Paterson-Passaic section was keen. Countries participating in the tin curtailment agreement produced in February, 5,727 long tons of tin, compared with 6,126 in January, and agreed upon quotas totaling 5,692 tons. Dutch East Indies produced 1,312 tons in February, compared with 1,382 in January and quota of 1,282 tons; Nigeria 317 tons, compared with 375 and quota of 317; Bolivia 1,339, 1,057 and 1,224, respectively; Malaya 2,219, 2,438 and 2,036 and Siam 540,874 and 833 tons, respectively.

Toluol — The sharp drop in automobile production schedules in March was responsible for a tapering off of shipments. Car dealers reported greatly improved demand for cars in the last 10 days of the month and this is expected to be reflected immediately in the manufacturing areas.

Zinc Salts — Prices were all well maintained in this group during the month. Paint manufacturers were extremely slow in coming into the market but this condition is thought to be only temporary and April and May tonnages are likely to be larger. Stocks of zinc in U. S. at end of February totaled 134,440 short tons, against 129,644 tons at end of January and cartel stocks reported as 165,386 tons at end of February, against 166,673 tons at end of January.

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1932 Average $1.64 - Jan. 1932 $1.54 - March 1933 $1.79

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Acetaldehyde, drs lc-1 wks...lb.	.18½	.21	.18½	.21	.18½	.21
Acetaldol, 50 gal dr.........lb.	.27	.31	.27	.31	.27	.31
Acetamide.................lb.	.95	1.35	.95	.35	.95	1.35
Acetanilid, tech, 150 lb bbl...lb.	....	.26	...	.26	.20	.26
Acetic Anhydride, 92-95%, 100 lb cbys..............lb.	.21	.25	.21	.25	.21	.25
Acetin, tech drums..........lb.	.30	.32	.30	.32	.30	.32
Acetone, tanks..............lb.	.08	.08½	.08	.10	...	.10
Acetone Oil, bbls NY.......gal..	1.15	1.25	1.15	1.25	1.15	1.25
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.55	.68
Acetylene Tetrachloride (see tetrachlorethane)..............						
Acids						
Acid Abietic..................	.12	.12	.12	.12	.12	.12
Acetic, 28% 400 lb bbls c-1 wks ....100 lb.	2.65	2.75	2.65	2.75	2.40	2.75
Glacial, bbl c-1 wk....100 lb.	....	9.14	...	9.14	8.35	9.14
Glacial, tanks...............	....	8.89	...	8.89	8.10	8.89
Adipic......................	.72	.72	.72	.72	.72	.72
Anthranilic, refd, bbls........lb.	.85	.95	.85	.95	.85	.95
Technical, bbls...........lb.	.65	.70	.65	.70	.65	.70
Battery, cbys...........100 lb.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb bbls....lb.	.35	.45	.35	.45	.35	.45
Boric, powd, 250 lb. bbls. ....lb.	.0425	.05	.0425	.05	.0425	.07
Broenner's, bbls.. ....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 100% basis cbys....lb.	.80	.85	.80	.85	.80	.85
Camphoric..................lb.	....	5.25	...	5.25	.....	5.25
Chlorosulfonic, 1500 lb drums wks.....................lb.	.04½	.05½	.04½	.05½	.04½	.05½
Chromic, 99½%, drs.........lb.	.11½	.12¼	.11½	.12¼	.11½	.14½
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.00	1.06
Citric, USP, crystals, 230 lb. bbls...................lb.	.29	.30	.29	.30	.29	.33½
Cleve's, 250 lb bbls.........lb.	.52	.54	.52	.54	.52	.54
Cresylic, 95%, dark drs NY.gal.	.38	.40	.38	.41	.40	.47
97-99%, pale drs NY.....gal.	.40	.42	.40	.44	.42	.50
Formic, tech 90%, 140 lb. cby.....................lb.	.10½	.12	.10½	.12	.10½	.12
Furoic, tech., 100 lb. drums.lb.	....	.35	...	.35	.....	.....
Gallic, tech, bbls...........lb.	.60	.70	.60	.70	.60	.70
USP, bbls................lb.	....	.74	...	.74	.....	.74
Gamma, 225 lb bbls wks.....lb	.75	.77	.75	.77	.75	.80
H, 225 lb bbls wks..........lb.	.60	.65	.60	.65	.60	.65
Hydriodic, USP, 10% soln cby lb.	.50	.51	.50	.51	.59	.67
Hydrobromic, 48%, coml, 155 lb cbys wks..............lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, CP, see Acid Muriatic.....................						
Hydrocyanic, cylinders wks .lb.	.80	.90	.80	.90	.80	.90
Hydrofluoric, 30%, 400 lb bbls wks....................lb.	....	.06	...	.06	.....	.06
Hydrofluosilicic, 35%, 400 lb. bbls wks..................lb.	.11	.12	.11	.12	.11	.12
Hypophosphorous, 30%, USP, demijohns ....lb.	.75	.80	.75	.80	.75	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.04	.04½
44%, light, 500 lb bbls.....lb.	.11½	.12	.11½	.12	.11½	.12
Laurent's, 250 lb bbls.... ...lb.	.36	.42	.36	.42	.36	.42
Linoleic.....................lb.	.16	.16	.16	.16	.16	.16
Malic, powd, kegs............lb.	.45	.60	.45	.60	.45	.60
Metanilic, 250 lb bbls........lb	.60	.65	.60	.65	.60	.65
Mixed Sulfuric - Nitric.........						
tanks wks..........N unit	.06½	.07½	.06½	.07½	.07	.07½
tanks wks..........S unit	.008	.01	.008	.01	.008	.01
Monochloroacetic, tech bbl...lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls..........lb.	1.50	1.60	1.50	1.60	1.55	1.70
Muriatic, 18 deg, 120 lb cbys c-1 wks............100 lb.	....	1.35	...	1.35	.....	1.35
tanks, wks...........100 lb.	....	1.00	...	1.00	.....	1.00
20 degrees, cbys wks...100 lb.	....	1.45	...	1.45	.....	1.45
N & W, 250 lb bbls............	.85	.95	.85	.95	.85	.95
Naphthionic, tech, 250 lb......	.60	.65	.60	.65	.60	.65
Nitric, 36 deg, 135 lb cbys c-wks. ....100 lb.	....	5.00	...	5.00	.....	5.00
40 deg, 135 lb cbys, c-1 wks...............100 lb.	....	6.00	...	6.00	.....	6.00
Oxalic, 300 lb bbls wks NY....lb.	.11	.11½	.11	.11½	.11	.11½
Phosphoric 50%, U. S. P.....lb.	....	.14	...	.14	.....	.14
Syrupy, USP, 70 lb drs....lb.	....	.14	...	.14	.....	.14
Picramic, 300 lb bbls........lb.	.65	.70	.65	.70	.65	.70
Picric, kegs.................lb.	.30	.50	.30	.50	.30	.50
Pyrogallic, crystals.......................................lb.	1.40	1.45	1.40	1.45	1.45	1.60
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.33	.37
Sebacic, tech, drum..........lb.	.58	.58	.58	.58	.....	.....
Sulfanilic, 250 lb. bbls.......lb.	....	.15	...	.15	.14½	.16

*Credit of 1c gal on 3 carlots or more.

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Sulfuric, 66 deg, 180 lb cbys lc-1 wks...........100 lb.	1.60	1.95	1.60	1.95	1.60	1.95
tanks, wks, ton	....	15.00	....	15.00	.....	15.00
1500 lb dr wks......100 lb.	1.50	1.65	1.50	1.65	1.50	1.65
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.27½	1.42½
Oleum, 20%, 1500 lb. drs lc-1 wks...................ton	....	18.50	....	18.50	.....	18.50
40%, lc-1 wks net........ton	....	42.00	....	42.00	.....	42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran. powd, 300 lb bbls.............lb.	.20	.21	.20	.21	.20	.25½
Tobias, 250 lb bbls........lb.	.75	.80	.75	.80	.75	.85
Trichloroacetic bottles.....lb.	2.00	2.75	2.00	2.75	.....	2.75
Kegs.....................lb.	...	1.75	....	1.75	.....	2.00
Tungstic, bbls.............lb.	1.40	1.70	1.40	1.70	1.40	1.70
Albumen, blood, 225 lb bbls...lb.	.35	.40	.35	.40	.35	.40
dark..............bbls., lb.	.10	.17	.10	.17	.10	.20
Egg, edible ....lb.	.74	.75	.74	.80	.75	.90
Technical, 200 lb cases...lb.	.62	.66	.62	.66	.62	.66
Vegetable, edible..........lb.	.60	.65	.60	.65	.60	.65
Technical..............lb.	.50	.55	.50	.55	.50	.55
Alcohol						
Alcohol Butyl, Normal, 50 gal drs c-1 wks............lb.	....	.123	....	.123	.123	.1595
Drums, 1-c-1 wks.......lb	....	.128	....	.128	'128	.1645
Tank cars wks..........lb.	....	.113	....	.113	.113	.143
Amyl (from pentane) Tanks wks ....lb.	....	.143	.143	.176	.176	.203
Capryl, tech, drums.......lb.	....	.85	....	.85	.....	.85
Diacetone, tanks..........lb.	.15¼	.16¾	.15¼	.16¾	.....	.....
Ethyl, USP, 190 pf, 50 gal. bbls.................gal.	2.53½	2.65	2.53½	2.65	2.55	2.65
Anhydrous, drums ...gal.	.54	58	.54	.58	.54	.58
No. 5. *188 pf, 50 gal. drs. drums extra..........gal.	....	.385*	....	.385*	.27	.396
No. S. D. 1, tanks ......gal.	....	.304	....	.304	.....	.....
Furfuryl, tech., 500 lb. drs.lb	.....	.45	....	.45	.....	.....
Isobutyl, ref., gal. drs.....gal.	....	.75	....	.75	.....	.75
Isopropyl, ref, gal drs.....gal.	.45	.50	.45	.50	.45	.65
Propyl Normal, 50 gal dr..gal.	....	.75	....	.75	.....	.75
Aldehyde Ammonia, 100 gal drlb.	.80	.82	.80	.82	.80	.82
Alpha-Naphthol, crude, 300 lb. bbls....................lb.	.65	.70	.65	.70	.57	.65
Alpha-Naphthylamine, 350 lb. bbls....................lb.	.32	.34	.32	.34	.32	.34
Alum Ammonia, lump, 400 lb bbls, 1-c-1 wks......100 lb.	3.00	3.25	3.00	3.25	3.00	3.25
Chrome, 500 lb casks, wks ....100 lb.	4.50	5.25	4.50	5.25	4.50	5.25
Potash, lump, 400 lb casks wks..............100 lb.	3.00	3.50	3.00	3.50	3.00	3.50
Soda, ground, 400 lb bbls wks...............100 lb.	3.50	3.75	3.50	3.75	3.50	3.75
Aluminum Metal, c-1 NY.100 lb.	22.90	24.30	22.00	24.30	22.90	24.30
Chloride Anhydrous ......lb.	.05	.09	.05	.09	.05	.09
Hydrate, 96%, light, 90 lb. bbls...................lb.	.15	.16½	.15	.16½	.15	.17
Stearate, 100 lb bbls.......lb.	.14	.17	.14	.17	.15	.21
Sulfate, Iron, free, bags c-1 wks..............100 lb.	1.90	1.95	1.90	1.95	1.90	1.95
Coml, bags c-1 wks .100 lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminoazobenzene, 110 lb kegs lb.	....	1.15	....	1.15	.....	1.15
Ammonia						
Ammonia anhydrous Com. tanks	....	.05	....	.05	.05	.05½
Ammonia, anhyd. 100 lb cyl...lb.	.15½	.15½	.15½	.15½	.15½	.15½
Water, 26°, 800 lb dr del...lb.	.02½	.03	.02½	.03	.02½	.03
Ammonia, aqua 26° tanks.... NH cont................	....	.05	.....	.05	.....	.....
Ammonium Acetate ....lb.	.26	.33	.26	.33	.26	.39
Bicarbonate, bbls., f.o.b. plant ....100 lb.	....	5.15	....	5.15	.....	5.15
Bifluoride, 300 lb bbls.....lb.	.14½	.17	.14½	.17	.14½	.22
Carbonate, tech, 500 lb cs..lb.	.08	.12	.08	.12	.08	.12
Chloride, white, 100 lb. bbls wks ....100 lb.	4.45	4.90	4.45	4.90	4.45	5.15
Gray, 250 lb bbls wks...lb.	5.25	5.75	5.25	5.75	5.25	5.75
Lump, 500 lb cks spot...lb.	.10	.11	.10	.11	.10½	.11½
Lactate, 500 lb bbls.......lb.	.15	.16	.15	.16	.15	.16
Linoleate.................lb.	....	.11	....	.11	.11	.15
Nitrate, tech, casks........lb.	.06	.10	.06	.10	.06	.10
Oleate, drs...............lb.	....	.10	....	.10	.....	.10
Persulfate, 112 lb kegs.....lb.	.20	.22½	.20	.22½	.20	.27½
Phosphate, tech, powd, 325 lb. bbls..................lb.	.08½	.11½	.08½	.11½	.08½	.12
Sulfate, bulk c-1.......100 lb.	.. .	1.05	1.00	1.05	.90	1.40
Sulfocyanide, kegs........lb.	.36	.48	.36	.48	.36	.48

Prices Current

Amyl Acetate
Dichloroethylether

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Amyl Acetate, (from pentane)						
Tanks del. ... lb.	....	.13½	...	.13½	.157	.17½
Tech., drs del. ... lb.	.142	.149	.138	.149	.17½	.18
Amyl Alcohol, see Fusel Oil.....						
Furoate, 1 lb tins ... lb.	...	5.00	...	5.00	.....	5.00
Aniline Oil, 960 lb drs & tks..lb.	.14½	.16	.14½	.16	.14½	.16
Annatto, fine ... lb.	.34	.37	.34	.37	.34	.37
Anthraquinone, sublimed, 125 lb. bbls ... lb.	....	.45	...	.45	.45	.55
Antimony, metal slabs, ton lots ... lb.	.05⅞	.06	.05⅞	.06	.05	.06½
Needle, powd, bbls ... lb.	.07	.08	.07	.08	.08½	.09
Chloride, soln (butter of) cbys ... lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls ... lb.	.07½	.08¾	.07½	.08¾	.07½	.08¾
Salt, 63% to 65%, tins ... lb.	.20	.23	.20	.23	.20	.24
Sulfuret, golden, bbls ... lb.	.16	.20	.16	.20	.16	.20
Vermillion, bbls ... lb.	.38	.42	.38	.42	.38	.42
Archil, conc, 600 lb bbls ... lb.	.20	.21	.20	.21	.17	.21
Double, 600 lb bbls ... lb.	.16	.17	.16	.17	.16	.17
Triple, 600 lb bbls ... lb.	.16	.17	.16	.17	.16	.17
Argols, 80%, casks ... lb.	.12	.12½	.12	.13	.12½	.13
Crude, 30%, casks ... lb.	.06¾	.07½	.06¾	.07½	.07	.07½
Aroclors, wks ... lb.	.18	.30	.18	.30	.18	.40
Arsenic, Red, 224 lb kegs, cs..lb.	.09¾	.10	.09¾	.10	.09¾	.10
White, 112 lb kegs ... lb.	.04	.05	.04	.05	.04	.05
Asbestine, c-1 wks ... ton	13.00	15.00	13.00	15.00	.....	15.00
Barium						
Barium Carbonate, 200 lb bags wks ... ton	38.00*	58.50	38.00	58.50	47.00	57.00
Chlorate, 112 lb kegs NY..lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.15
Chloride, 600 lb bbl wks...ton	63.00	69.00	63.00	69.00	63.00	69.00
Dioxide, 88%, 690 lb drs...lb.	.11	.13	.11	.13	.11	.13
Hydrate, 500 lb bbls ... lb.	.04½	.05	.04½	.05	.04¾	.05½
Nitrate, 700 lb casks ... lb.	...	.07½	...	.07½	.07	.08
Barytes, Floated, 350 lb bbls wks ... ton	22.20	30.50	22.20	30.50	22.00	24.00
Bauxite, bulk, mines ... ton	5.00	6.00	5.00	6.00	5.00	6.00
Bayberry, bags ... lb.	.14½	.16	.14½	.16	.....	.....
Beeswax, Yellow, crude bags..lb.	...	.14	.13½	.14	.14½	.24
Refined, cases ... lb.	.20	.21	.20	.21	.20	.28
White, cases ... lb.	.30	.32	.30	.32	.30	.36
Benzaldehyde, technical, 945 lb. drums wks ... lb.	.60	.65	.60	.65	.60	.65
Benzene, 90%, Industrial, 8000 gal tanks wks ... gal.	...	.22	.20	.22	.....	.20
Ind. Pure, tanks works ... gal.	...	.22	.20	.22	.....	.20
Benzidine Base, dry, 250 lb. bbls ... lb.	.65	.67	.65	.67	.65	.67
Benzoyl, Chloride, 500 lb drs..lb.	.40	.45	.40	.45	.40	.47
Benzyl Chloride, tech drs ... lb.	...	.30	...	.30	.....	.30
Beta-Naphthol, 250 lb bbl wk..lb.	...	.22	...	.22	.....	.22
Naphthylamine, sublimed, 200 lb bbls ... lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ... lb.	.53	.58	.53	.58	.53	.58
Blanc Fixe, 400 lb bbls wks..ton	60.00	75.00	60.00	75.00	60.00	80.00
Bleaching Powder, 800 lb drs c-1 wks contract ... 100 lb.	1.75	2.00	1.75	2.00	1.75	2.00
Blood, Dried, fob, NY ... Unit	...	2.00	1.55	2.00	1.20	1.90
Chicago ... Unit	...	1.60	1.15	1.60	1.50	1.60
S. American shipt ... Unit	1.85	2.00	1.80	2.00	2.00	2.25
Blues, Bronze Chinese Milori Prussian Soluble ... lb.	...	.35	...	.35	.....	.35
Bone, raw, Chicago ... ton	19.00	21.00	19.00	21.00	20.00	22.00
Bone Ash, 100 lb kegs ... lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls ... lb.	.06	.08½	.06	.08½	.05½	.08½
Meal, 3% & 50%, Imp ... ton	18.50	19.00	20.50	21.00	20.00	23.00
Borax, bags ... lb.	.018	.02	.018	.02	.018	.03½
Bordeaux, Mixture, 16% pwd..lb.	.11½	.13	.11½	.13	.11½	.13
Paste, bbls ... lb.	.11½	.13	.11½	.13	.11½	.13
Brazilwood, sticks, shpmt ... lb.	26.00	28.00	26.00	28.00	26.00	28.00
Bromine, cases ... lb.	.36	.43	.36	.43	.36	.43
Bronze, Aluminum, powd blk..lb.	.50	.75	.50	.75	.60	1.20
Gold bulk ... lb.	.40	.55	.40	.55	.55	1.25
Butanes, com 16.32° group 3 tanks ... lb.	.02¾	.04	.02¾	.04	.....	.....
Butyl, Acetate, normal drs...lb.	.134	.139	.134	.139	.134	.166
Tank, wks ... lb.	...	.124	...	.124	.124	.143
Aldehyde, 50 gal drs wks..lb.	.31½	.36	.31½	.36	.31½	.36
Carbitol see Diethylene Glycol Mono (Butyl Ether)	.....	.....	.....	.....	.....	.....
Cellosolve (see Ethylene glycol mono butyl ether) ...						
Furoate, tech., 50 gal. dr...lb.	...	.50	...	.50	.....	.50
Propionate, drs ... lb.	.20	.22	.20	.22	.20	.25
Stearate, 50 gal drs ... lb.	.25	.25½	.25	.25½	.25	.25½
Tartrate, drs ... lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes ... lb.	.65	.75	.65	.75	.65	.90
Calcium, Acetate, 150 lb bags c-1 ... 100 lb.	...	2.50	....	2.50	2.00	2.50
Arsenate, 100 lb bbls c-1 wks ... lb.	.05½	.06	.05½	.06	.05½	.06
Carbide, drs ... lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bags c-1 ... lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks ... ton	...	21.00	....	21.00	.....	21.00
Solid, 650 lb drs c-1 fob wks ... ton	...	18.00	....	18.00	.....	18.00
Calcium Furoate, tech, 100 lb. drums ... lb.	...	.30	...	.30	.....	.30
Nitrate, 100 lb bags ... ton	24.00	26.00	24.00	26.00	34.00	35.00
Palmitate, bbls ... lb.	.16	.19	.16	.19	.....	.....
Peroxide, 100 lb drs ... lb.	...	1.25	...	1.25	.....	1.25
Phosphate, tech, 450 lb bbls.lb.	.07½	.08	.07½	.08	.07½	.08½
Stearate, 100 lb. bbls ... lb.	.14	.16	.14	.16	.16	.18

†F. O. B. destination, 1931 prices are works prices.
*Low price applies to natural barium carbonate (Witherite)

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Camphor, slabs ... lb.	...	.38	.35½	.42	.....	.....
Powder ... lb.	.39	.40	.38	.43	.....	.....
Camwood, Bark, ground bbls.lb.	.16	.18	.16	.18	.16	.18
Candelilla Wax, bags ... lb.	.10	.11	.10	.11	.10	.14
Carbitol, (See Diethylene Glycol Mono Ethyl Ether) ...	.....	....	...	.....	.....	.....
Carbon, Decolorizing, drums c-1 ... lb.	.08	.15	.08	.15	.08	.15
Black, 100-300 lb cases 1c-1 NY ... lb.	.06	.12	.06	.12	.06	.12
Bisulfide, 500 lb drs 1c-1 NY ... lb.	.05½	.06	.05½	.06	.05½	.06
Dioxide, Liq. 20-25 lb cyl..lb.	...	.06	....	.06	.....	.06
Tetrachloride, 1400 lb drs delivered ... lb.	.06½	.07	.06½	.07	.06½	.07
Carnauba Wax, Flor, bags...lb.	.23	.24	.23	.24	.23	.28
No. 1 Yellow, bags ... lb.	.20	.21	.20	.22	.21	.24
No. 2 N Country, bags ... lb.	.14	.15	.14	.15	.13	.16
No. 2 Regular, bags ... lb.	.20	.21	.20	.21	.20	.24
No. 3 N. C. ... lb.	.12	.12½	.11½	.12½	.11	.13
No. 3 Chalky ... lb.	.12	.12½	.12	.12½	.11	.13
Casein, Standard, Domestic.... ground ... lb.	.07	.07½	.07	.07½	.04¾	.07½
Cellosolve (see Ethylene glycol mono ethyl ether) ...						
Acetate (see Ethylene glycol mono ethyl ether acetate)..						
Celluloid, Scraps, Ivory cs ... lb.	...	.15	....	.15	.13	.15
Shell, cases ... lb.	.18	.20	.18	.20	.18	.20
Transparent, cases ... lb.	...	.16	....	.16	.....	.15
Cellulose, Acetate, 50 lb kegs.lb.	.80	.90	.80	.90	.80	.90
Chalk, dropped, 175 lb bbls..lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks...lb.	.02	.03½	.02	.03½	.02	.03½
Light, 250 lb casks ... lb.	.02½	.03½	.02½	.03½	.02½	.03½
Charcoal, Hardwood, lump, bulk wks ... bu.	.18	.19	.18	.19	.18	.19
Willow, powd, 100 lb bbl. wks ... lb.	.06	.06½	.06	.06½	.06	.06½
Wood, powd, 100 lb bbls...lb.	.04	.05	.04	.05	.04	.05
Chestnut, clarified bbls wks...lb.	.01⅞	.02	.01⅞	.02	.01⅞	.02
25% tks wks ... lb.	.012	.01½	.012	.01½	.01¾	.02½
Powd, 60%, 100 lb bgs wks.lb.	...	.04¾	....	.04¾	.....	.04¾
Powd, decolorized bgs wks..lb.	.04⅛	.05	.04⅛	.05	.04⅛	.06
China Clay, lump, blk mines..ton	8.00	9.00	8.00	9.00	8.00	9.00
Powdered, bbls ... lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls wks ... ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, bulk ... ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine						
Chlorine, cyls 1c-1 wks contract ... lb.	.07	.08½	.07	.08½	.07	.08½
cyls, cl., contract ... lb.	...	.05½†	....	.05½†	....	.05½
Liq tank or multi-car lot cyls wks contract ... 100 lb.	...	1.75	....	1.75	1.55	1.75
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks ... lb.	.06	.07½	.06	.07½	.06	.10½
Chloroform, tech, 1000 lb drs..lb.	.15	.16	.15	.16	.15	.16
Chloropicrin, comml cyls ... lb.	1.00	1.35	1.00	1.35	1.00	1.35
Chrome, Green, CP ... lb.	.23	.29	.23	.29	.23	.29
Commercial ... lb.	.06½	.10	.06½	.10	.06½	.11
Yellow ... lb.	.14	.15	.14	.15	.14	.18
Chromium, Acetate, 8% Chrome bbls ... lb.	.04¾	.05¾	.04¾	.05¾	.04¾	.05¾
20° soln, 400 lb bbls ... lb.	...	.05½	....	.05½	.....	.05½
Fluoride, powd, 400 lb bbl..lb.	.27	.28	.27	.28	.27	.28
Oxide, green, bbls ... lb.	.28	.33	.28	.33	.28	.35½
Coal tar, bbls ... bbl.	8.00	9.00	8.00	9.00	10.00	10.50
Cobalt Oxide, black, bags ... lb.	1.15	1.25	1.15	1.25	1.15	1.45
Cochineal, gray or black bag..lb.	.36	.42	.36	.42	.38	.57
Teneriffe silver, bags ... lb.	.37	.43	.37	.43	.39	.57
Copper, metal, electrol...100 lb.	....	5.00	....	5.00	5.05	7.25
Carbonate, 400 lb bbls ... lb.	.07	.15½	.07	.15½	.07	.16½
Chloride, 250 lb bbls ... lb.	.17	.18	.17	.18	.17	.25
Cyanide, 100 lb drs ... lb.	.39	.40	.39	.40	.39	.40
Oxide, red, 100 lb bbls ... lb.	.14¾	.15	.14¾	.15	.15	.16
Sub-acetate verdigris, 400 lb bbls ... lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls c-1 wks ... 100 lb.	...	3.00	....	3.00	2.75	3.10
Copperas, crys and sugar bulk c-1 wks bags ... ton	14.00	14.50	14.00	14.50	14.00	14.50
Cotton, Soluble, wet, 100 lb bbls ... lb.	.40	.42	.40	.42	.40	.42
Cottonseed, S. E. bulk c-1...ton	...	26.50	....	26.50	.....	26.50
Meal S. E. bulk ... ton	...	.....	.....	.....	.....	.....
7% Amm., bags mills...ton	13.25	38.00	13.25	38.00	13.25	38.00
Cream Tartar, USP, 300 lb. bbls ... lb.	.14½	.15	.14½	.15	.15½	.20½
Creosote, USP, 42 lb cbys ... lb.	.40	.42	.40	.42	.40	.42
Oil, Grade 1 tanks ... gal.	.11	.12	.11	.12	.11	12½
Grade 2 ... gal.	.10	.11	.10	.11	.10	.11½
Grade 3 ... gal.	.09	.11	.09	.11	.09	.11½
Cresol, USP, drums ... lb.	.10½	.11	.10½	.11	.10½	.11
Crotonaldehyde, 50 gal dr ... lb.	.32	.36	.32	.36	.32	.36
Cudbear, English ... lb.	.16	.17	.16	.17	.16	.17
Cutch, Rangoon, 100 lb bales.lb.	.05½	.07	.05½	.07	.08¾	.12
Borneo, Solid, 100 lb bale...lb.	.02½	.03	.02½	.03	.03	.07
Cyanamide, bags c-1 frt allowed Ammonia unit ...	...	.97½	....	.97½	.	.97½
Dextrin, corn, 140 lb bags.100 lb.	3.24	3.34	2.89	3.34	2.99	3.67
White, 140 lb bags ... 100 lb.	...	3.09	2.94	3.09	2.94	3.37
Potato Yellow, 220 lb bgs..lb.	.07¾	.08¾	.07¾	.09	.08	.09
White, 220 lb bags 1c-1 ... lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 lb bags 1c-1..lb.	.06¾	.07¾	.06¾	.08	.07	.08¾
Diamylphthalate, drs wks...gal.	...	3.80	....	3.80	.....	3.80
Dianisidine, barrels ... lb.	2.35	2.70	2.35	2.70	2.35	2.70
Dibutylphthalate, wks ... lb.	.20½	.21	.20½	.22	.218	.23½
Dibutyltartrate, 50 gal drs...lb.	.29½	.31½	.29½	.21	.29½	.31½
Dichloroethylether, 50 gal drs lb.	...	.16	....	.16	.....	.16

Prices Current

Dichloromethane
Lead Oleate

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Dichloromethane, drs wks....lb.	.55	.65	.55	.65	.55	.65
Diethylamine, 400 lb drs.....lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylcarbonate, drs.......gal.	1.85	1.90	1.85	1.90	1.85	1.90
Diethylaniline, 850 lb drs....lb.	.52	.55	.52	.55	.55	.60
Diethyleneglycol, drs........lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ether, drs...lb.	.15	.16	.15	.16	.15	.16
Mono butyl ether, drs...lb.	.....	.26	....	.26	.24	.30
Diethylene oxide, 50 gal drs..lb.	.26	.27	.26	.27	.....	.....
Diethylorthotoluidin, drs.....lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb. drums.................lb.	.23	.26	.23	.26	.23	.26
Diethylsulfate, technical, 50 gal drums.................lb.	...	...	....	....	.30	.35
Dimethylamine, 400 lb drs, pure 25 & 40% sol. 100% basis.lb.	.....	1.20	....	....	.....	....
Dimethylaniline, 340 lb drs...lb.	.25	.27	.25	.27	.25	.27
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls...lb.	.....	.18	....	.18	.15	.16
Dintrochlorobenzene, 400 lb bbls.................lb.	.13	.15	.13	.15	.13	.15
Dinitronaphthalene, 350 lb bbls ....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls....lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls....lb.	.16	.17	.16	.17	.16	.17
Dioxan (See Diethylene Oxide).......		.....	....	....	.....	.....
Diphenyl....................lb.	.20	.40	.20	.40	.20	.40
Diphenylamine..............lb.	.31	.34	.31	.34	.34	.37
Diphenylguanidine, 100 lb bbl lb.	.30	.35	.30	.35	.30	.35
Dip Oil, 25%, drums........lb.	.23	.25	.23	.25	.26	.30
Divi Divi pods, bgs shipmt..ton	26.00	28.00	26.00	28.00	26.00	30.00
Extract....................lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb cases ......lb.	.40	.42	.40	.43	.40	.52
Epsom Salt, tech, 300 lb bbls c-1 NY..........100 lb.	.....	2.20	....	2.20	1.70	1.90
Ether, USP anaesthesia 55 lb. drs. ....lb.	.22	.23	.22	.23	.22	.23
(Conc)....................lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal. drums ...lb.	.07	.08	.07	.08	.....	.....
Ethyl Acetate, 85% Ester tanks.................lb.	.07½	.08	.07½	.09	.08½	.09
drums.................lb.	.08½	.09	.08½	.10	.09½	.10
Anhydrous, tanks.........lb.	.09	.10	.09	.10	.....	.10
drums.................lb.	.10	.10¼	.10	.10¼	.....	.10½
Acetoacetate, 50 gal drs....lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drums......lb.	.50	.55	.50	.55	.50	.55
Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.85	1.90	1.85	1.90
Chloride, 200 lb drums.....lb.	.....	.22	....	.22	.....	.22
Chlorocarbonate, cbys.....lb.	.....	.30	....	.30	.....	.30
Ether, Absolute, 50 gal drs.lb.	.50	.52	.50	.52	.50	.52
Furoate, 1 lb tins.........lb.	.....	5.00	....	5.00	.....	5.00
Lactate, drums works ....lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs..lb.	.....	.30	....	.30	.....	.30
Oxalate, drums works......lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks lb.	.....	.30½	....	.30½	.....	.30½
Ethylene Dibromide, 60 lb dr..lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys. chloro, cont.............lb.	.75	.85	.75	.85	.7	.85
Dichloride, 50 gal drums....lb.	.05	.09	.05	.09	.0595	.07
Glycol, 50 gal drs wks.....lb.	.25	.28	.25	.28	.25	.28
Mono Butyl Ether drs wks.	.....	.20	....	.20	.20	.24
Mono Ethyl Ether drs wks	.15	.17	.15	.17	.15	.20
Mono Ethyl Ether Acetate dr. wks.................lb.	.16½	.18	.16½	.18	.16½	.23
Mono Methyl Ether, drs..lb.	.21	.23	.21	.23	.21	.23
Stearate..................lb.	.18	.18	.18	.18	.18	.18
Oxide, cyl.................lb.	.....	.75	....	.75	.75	2.00
Ethylidenaniline............lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, bulk.............ton	15.00	20.00	15.00	20.00	15.00	20.00
Powdered, bulk works....ton	15.00	21.00	15.00	21.00	15.00	21.00
Ferric Chloride, tech, crystal 475 lb bbls.............lb.	.04½	.07	.04½	.07	.04½	.07½
Fish Scrap, dried, wks......unit	.....	1.85*	....	1.85*	1.60	3.00
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	2.00†	1.85	2.00†	1.40	2.40
Fluorspar, 98%, bags..........	28.00	35.50	28.00	35.50	28.00	46.00

*& 10; †& 50

Formaldehyde

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Formaldehyde, aniline, 100 lb. drums.................lb.	.37½	.42	.37½	.42	.37½	.42
USP, 400 lb bbls wks......lb.	.06	.07¾	.06	.07¾	.06	.07¾
Fossil Flour................lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, bulk, mines...ton	15.00	20.00	15.00	20.00	15.00	20.00
Imp. powd c-1 bags.......ton	24.00	30.00	24.00	30.00	24.00	30.00
Furfural (tech.) drums wks,..lb.	.....	.10	....	.10	.....	.10
Furfuramide (tech) 100 lb dr..lb.	.....	.30	....	.30	.....	.30
Furfuryl Acetate, 1 lb tins....lb.	.....	5.00	....	5.00	.....	5.00
Fusel Oil, 10% impurities....lb.	.....	.14½	....	.14½	.....	.....
Fustic, chips...............lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes.....lb.	.18	.20	.18	.20	.18	.20
Liquid 50°, 600 lb bbls.....lb.	.07	.08	.07	.08	.07	.08
Solid, 50 lb boxes.........lb.	.14	.16	.14	.16	.14	.16
Sticks.....................ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls.....lb.	.42	.43	.42	.43	.42	.50
Gall Extract................lb.	.18	.20	.18	.20	.18	.20
Gambier, common 200 lb cs..lb.	.06	.07	.06	.07	.06½	.07
25% liquid, 450 lb bbls.....lb.	.08	.10	.08	.10	.08	.10
Singapore cubes, 150 lb bg..lb.	.06	.07	.06	.07	.07¼	.09
Gelatin, tech, 100 lb cases...lb.	.45	.50	.45	.50	.45	.50
Glauber's Salt, tech, c-1 wks. ....100 lb.	1.00	1.70	1.00	1.70	1.00	1.70
Glucose (grape sugar) dry 70-80° bags c-1 NY........100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb bags ....100 lb.	.....	2.33	....	2.33	2.36	2.75

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Glue, medium white, bbls....lb.	.12	.13	.12	.13	.15½	.20
Pure white, bbls...........lb.	.18	.20	.18	.20	.18	.27
Glycerin, CP, 550 lb drs......lb.	.....	.10½	....	.10½	.09¾	.11¼
Dynamite, 100 lb drs.......lb.	.....	.07½	....	.07½	.07¼	.09¾
Saponification, tanks......lb.	.....	.05	....	.05	.04½	.06½
Soap Lye, tanks.........lb.	.04	.04⅜	.04	.04⅜	.03¾	.05
Glyceryl Stearate, bbls......lb.	.....	.17	....	.17	.....	.17
Graphite, crude, 220 lb bgs..ton	12.00	23.00	12.00	23.00	12.00	35.00
Flake, 500 lb bbls.........lb.	.05	.06	.05	.06	.05	.09

Gums

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Gum Accroides, Red, coarse and fine 140-150 lb bags.......lb.	.03¾	.04¼	.03¾	.04¼	.03¾	.04¼
Powd, 150 lb bags.........lb.	.06	.06½	.06	.06½	.06	.06½
Yellow, 150-200 lb bags....lb.	.18	.20	.18	.20	.18	.20
Animi (Zanzibar) bean & pea 250 lb cases.............lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases.......lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts..........lb.	.....	.06¼	.05¾	.06¼	.....	.....
Asphaltum, Barbadoes (Manjak) 200 lb bags.............lb.	.04	.05	.04	.05	.04	.06
Egyptian, 200 lb cases.......lb.	.13	.15	.13	.15	.13	.15
Gamboge, pipe, cases........lb.	.....	.50	.42	.50	.....	.....
Powdered, bbls...........lb.	.....	.60	.50	.60	.....	.....
Gilsonite Selects, 200 lb bags ....ton	30.50	32.90	30.50	32.90	30.50	32.90
Damar Batavia standard 136, lb. cases..................lb.	.08½	.09	.08½	.09	.08½	.09
Batavia Dust, 160 lb bags.....lb.	.04	.05	.04	.05	.04	.05½
E Seeds, 136 lb cases.......lb.	.05½	.06	.05½	.06	.05½	.06½
F Splinters, 136 lb cases and bags.................lb.	.05½	.06	.05½	.06	.05½	.06
Singapore, No. 1, 224 lb cases .lb.	.09½	.10	.09½	.10	.10½	.11
No. 2, 224 lb cases........lb.	.....	.07	....	.07	.06	.07½
No. 3, 180 lb bags.........lb.	.04½	.05	.04½	.05	.04½	.05
Benzoin Sumatra, U. S. P. 120 lb. cases...................lb.	.17	.18	.17	.20	.18	.22
Copal Congo, 112 lb bags, clean opaque.................lb.	.16½	.17	.16½	.17	.16½	.17
Dark, amber..............lb.	.06	.07	.06	.07	.06	.07
Light, amber.............lb.	.08	.08½	.08	.08½	.08	.09
Water, white.............lb.	.37	.45	.37	.45	.37	.45
Mastic.......................lb.	.26¾	.27	.26¾	.27	.26¾	.40
Manila 180-190 lb baskets						
Loba A..................lb.	.09	.10	.09	.10	.09	.11
Loba B..................lb.	.08	.08½	.08	.08½	.08	.08½
Loba C..................lb.	.07	.08	.07	.08	.07	.08
M A Sorts...............lb.	.05	.05½	.05	.05½	.04½	.05
D B B Chips.............lb.	.05¾	.06	.05¾	.06	.05	.06½
East Indies chips, 180 lb bags lb.	.04½	.05	.04½	.05	.04½	.05½
Pale bold, 224 lb cs.....lb.	.05½	.06	.05½	.06	.06	.08
Pale nubs, 180 lb bags....lb.	.03½	.04	.03½	.04	.03½	.05
Pontianak, 224 lb cases......						
Bold gen No. 1.........lb.	.14	.15	.14	.15	.14	.16
Gen. chips spot.........lb.	.06¾	.07	.06¾	.07	.05	.08
Elemi, No. 1, 80-85 lb cs...lb.	.09	.09½	.09	.09½	.09	.09½
No. 2, 80-85 lb cases.....lb.	.08½	.09	.08½	.09	.08½	.09
No. 3, 80-85 lb cases.....lb.	.08	.08½	.08	.08½	.08	.08½
Kauri, 224-226 lb cases No. 1 ....lb.	.20	.25	.20	.25	.20	.42
No. 2 fair pale..........lb.	.12½	.16	.12½	.16	.12½	.30
Brown Chips, 224-226 lb. cases................lb.	.10	.12	.10	.12	.10	.12
Bush Chips, 224-226 lb. cases................lb.	.22	.24	.22	.24	.22	.24
Pale Chips, 224-226 lb cases ....lb.	.11	.14	.11	.14	.11	.14
Sandarac, prime quality, 200 lb bags & 300 lb casks...lb.	.21	.22	.21	.23½	.23	.25½
Tragacanth, No. 1 bags....lb.	.67	.70	.67	.75	.....	.....
Helium, 1 lit. bot............lit.	.....	25.00	....	25.00	.....	25.00
Hematine crystals, 400 lb bbls lb.	.10	.18	.10	.18	.10	.18
Paste, 500 bbls...........lb.	.....	.11	....	.11	.....	.11
Hemlock 25%, 600 lb bbls wks lb.	.03½	.04½	.03½	.04½	.03	.04½
Bark......................ton	.....	16.00	....	16.00	.....	16.00
Hexalene, 50 gal drs wks......lb.	.....	.30	....	.30	.30	.40
Hexamethylenetetramine, drs lb.	.46	.47	.46	.47	.46	.47
Hoof Meal, f.o.b. Chicago...unit	.75	.80	.75	.80	.75	1.35
South Amer. to arrive....unit	.....	1.45	....	1.45	1.25	1.65
Hydrogen Peroxide, 100 vol, 140 lb cbys.................lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride lb.	.....	3.15	....	3.15	.....	3.15
Hypernic, 51°, 600 lb bbls....lb.	.11	.12	.11	.12	.11	.12

Indigo

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Indigo Madras, bbls.........lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drums.........lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid..........lb.	.....	.12	....	.12	.....	.12
Iron Chloride. see Ferric or Ferrous						
Iron Nitrate, kegs...........lb.	.09	.10	.09	.10	.09	.10
Coml, bbls..........100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Oxide, English..........lb.	.04	.10	.04	.10	.04	.10
Japan Wax, 224 lb cases.....lb.	.05½	.05¾	.05½	.06	.06	.09
Kieselguhr, 95 lb bgs NY Brown...................ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, bbls wks...100 lb.	8.50	9.00	8.50	9.50	9.00	10.00
White crystals, 500 lb bbls wks..................100 lb.	9.50	10.00	9.50	10.50	10.00	11.00
Arsenate, drs 1c-1 wks....lb.	.09	.10½	.09	.10½	.09½	.13
Dithiofuroate, 100 lb dr....lb.	.....	1.00	....	1.00	.....	1.00
Metal, c-1 NY.........100 lb.	.....	3.00	....	3.00	2.70	3.75
Nitrate, 500 lb bbls wks....lb.	.10½	.14	.10½	.14	.10½	.14
Oleate, bbls................lb.	.15	.16	.15	.16	.15	.18

Prices Current

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Lead Oxide Litharge, 500 lb. bbls....lb.	.05½	.06	.05½	.06	.05½	.07
Red, 500 lb bbls wks....lb.	.06½	.07	.06½	.07	.06½	.07
White, 500 lb bbls wks...lb.	.06	.07	.06	.07	.06	.07
Sulfate, 500 lb bbls wk...lb.	.05½	.05¾	.05½	.05¾	.05½	.06
Leuna saltpetre, bags c.i.f.....ton	.....	Nom.	....	Nom	.....	Nom.
S. points c.i.f.....ton	.....	Nom.	....	Nom.	.....	Nom.
Lime, ground stone bags.....ton	.....	4.50	....	4.50	.....	4.50
Live, 325 lb bbls wks...100 lb.	.....	1.05	....	1.05	.....	1.05
Lime Salts, see Calcium Salts						
Lime-Sulfur soln bbls.......gal.	.15	.17	.15	.17	.15	.17
Linseed cake, bulk..........ton	18.50	19.00	17.50	19.50	.....	.....
Lithopone, 400 lb bbls 1c-1 wks ....lb.	.04¾	.05	.04¾	.05	.04¾	.05
Logwood, 51°, 600 lb bbls....lb.	.05	.08	.05	.08	.05	.08
Chips, 150 lb bags.........lb.	.03	.03½	.03	.03½	.03	.03½
Solid, 50 lb boxes.........lb.	.08	.12½	.08	.12½	.08	.12½
Sticks..........ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch.............lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl...ton	46.00	56.00	46.00	56.00	50.00	60.00
Magnesium						
Magnesium Carb, tech, 70 lb. bags NY..........lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.06½
Chloride flake, 375 lb. drs c-1 wks..........ton	34.00	36.00	34.00	36.00	35.00	36.00
Imported shipment.....ton	31.75	33.00	31.75	33.00	31.75	33.00
Fused, imp., 900 lb bbls NY ton	.....	31.00	....	31.00	.....	31.00
Fluosilicate, crys, 400 lb bbls wks..........lb.	.10	10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls ....lb.	.....	.42	....	.42	.....	.42
Heavy, 250 lb bbls......lb.	.....	.50	....	.50	.....	.50
Peroxide, 100 lb cs........lb.	1.00	1.25	1.00	1.25	1.00	1.25
Silicofluoride, bbls.........lb.	.09¾	.10¼	.09¾	.10¼	.09¾	.10¼
Stearate, bbls.............lb.	.16½	.17	.16½	.17	.16½	.26
Manganese Borate, 30%, 200 lb bbls..........lb.	.15	.16	.15	.16	.15	.19
Chloride, 600 lb casks......lb.	.07	.08	.07	.08	.07	.08½
Dioxide, tech (peroxide) drs lb.	.03½	.06	.03½	.06	.03½	.06
Sulfate, 550 lb drs NY.....lb.	.07	.08	.07	.08	.07	.08
Mangrove 55%, 400 lb bbls...lb.	.....	.04	....	.04	.....	.04
Bark, African...........ton	.....	23.00	22.00	23.00	21.00	25.00
Marble Flour, bulk.........ton	12.00	13.00	12.00	13.00	12.00	15.00
Mercurous chloride..........lb.	.67	.72	.67	.72	.67	.93
Mercury metal......76 lb flask	.....	54.00	48.00	54.00	47.00	74.50
Meta-nitro-aniline...........lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-para-toluidine 200 lb. bbls..........lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb. bbls..........lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb. bbls..........lb.	.67	.69	.67	.69	.67	.69
Methanol, (Wood Alcohol)......						
95% tanks............gal.	.33	.35	.33	.35	.33	.35
97% tanks............gal.	.34	.39	.34	.39	.34	.39
*Pure, Synthetic drums cars gal.	.....	.37½	....	.37½	.37½	.41½
*Synthetic tanks..........gal.	.....	.35½	....	.35½	.....	.35½
Methyl Acetate, drums 82% gal.	.12	.13	.12	.13	.12	.17½
99%..........gal.	.....	.15	....	.15	.....	.15
Acetone, drums..........gal.	.45	.47	.45	.49	.47	.55
Hexyl Ketone, pure.....lb.	.....	1.20	....	1.20	.....	1.20
Anthraquinone...........lb.	.65	.67	.65	.67	.65	.95
Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	....	.....	.....	.....
Chloride, 90 lb cyl.......lb.	.45	.45	.45	.45	.45	.45
Furoate, tech., 50 gal. dr...lb.	.....	.50	....	.50	.....	50
Mica, dry grd. bags wks....lb.	65.00	80.00	65.00	80.00	65.00	80.00
Michler's Ketone, kegs......lb.	.....	3.00	....	3.00	.....	3 00
Molasses, blackstrap, tanks f.o.b. N. Y..........gal.	.....	.05	.05	.05	.....	.....
Monochlorobenzene, drums see, Chlorobenzene, mono.....lb.						
Monomethylparaminosulfate 100 lb drums..........lb.	3.75	4.00	3.75	4.00	3.75	4.00
Montan Wax, crude, bags....lb.	.03¾	.04	.03¾	.04	.03¾	.07
Myrobalans 25%, liq bbls....lb.	.03¾	.04½	.03¾	.04½	.03¾	.04½
50% Solid, 50 lb boxes.....lb.	.05	.05½	.05	.05½	.05	.05½
J1 bags..........ton	34.00	35.00	34.00	35.00	34.00	35.00
J2 bags..........ton	15.50	16.50	15.50	16.50	15.25	18.50
R2 bags..........ton	15.00	16.00	15.00	16.00	14.75	17.50
Naphtha, v.m.& p. (deodorized) tanks..........gal.	.08½	.09	.08½	.09	.08½	.10
Naphthalene balls, 250 lb bbls wks..........lb.	.....	.05½	....	.05½	.03¾	.05½
Crushed, chipped bgs wks...lb.	.....	.04½	....	.04½	.....	.04½
Flakes. 175 lb bbls wks.....lb.	.....	.04¾	....	.04¾	.03¾	.04¾
Nickel Chloride, bbls........lb.	.17	.18	.17	.18	.18	.20
Oxide, 100 lb kegs NY....lb.	.35	.37	.35	.37	.35	.40
Salt bbl. 400 bbls lb NY...lb.	.11	.13	.11	.13	.10½	.13
Single, 400 lb bbls NY.....lb.	.11	.12	.11	.12	.10½	.12
Metal ingot..........lb.	.35	.35	.35	.35	.35	.35
Nicotine, free 40%, 8 lb tins, cases..........lb.	1.25	1.30	1.25	1.30	1.25	1.30
Sulfate, 55 lb. drums......lb.	.74½	.86	.74½	.86	.74½	.....
Nitre Cake, bulk..........ton	10.00	12.00	10.00	12.00	10.0C	12.00
Nitrobenzene, redistilled, 1000 lb drs wks..........lb.	.09	.09½	.09	.09½	.09	.09½
Nitrocellulose, c-l-l-cl, wks...lb.	.29½	.33	.29½	.33	.25	.36
Nitrogenous Material, bulk.unit	1.50	1.60	1.50	1.60	1.35	1.55
Nitronaphthalene, 550 lb bbls.lb.	.....	.25	....	.25	....	25
Nitrotoluene, 1000 lb drs wks.lb.	.14	.15	.14	.15	.14	.15
Nutgalls Aleppy, bags.......lb.	.....	.18	....	.18	.....	.18
Chinese, bags..........lb.	.17	.18	.17	.18	.17	.18
Oak Bark, ground..........ton	30.00	35.00	30.00	35.00	30.00	35.00
Whole..........ton	20.00	23.00	20.00	23.00	20.00	23.00
Orange-Mineral, 1100 lb casks NY..........lb.	.10½	.10¾	.10½	.10¾	.09½	.10¾

*delivered basis (east of Miss. River)

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Orthoaminophenol, 50 lb kgs..lb.	2.15	2.25	2.15	2.25	2.1	2.25
Orthoanisidine, 100 lb drs....lb.	1.00	1.15	1.00	1.15	1.15	1.50
Orthochlorophenol, drums....lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drums..........lb.	.13	.15	.13	.15	.13	.22
Orthodichlorobenzene, 1000 lb. drums..........lb.	.07	.10	.07	.10	.07	.10
Orthonitrochlorobenzene, 1200 lb drs wks..........lb.	.28	.29	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs wk..........lb.	.14	.16	.14	.16	.14	.18
Orthonitrophenol, 350 lb dr...lb.	.85	.90	.85	.90	.85	.90
Orthotoluidine, 350 lb bbl 1c-1 lb.	.20	.22	.20	.22	.20	.22
Orthonitroparachlorphenol, tins ....lb.	.70	.75	.70	.75	.70	.75
Osage Orange, crystals.......lb.	.16	.17	.16	.17	.16	.17
51 deg. liquid..........lb.	.06	.06½	.06	.06½	.06	.07½
Powdered. 100 lb bags.....lb.	.14½	.15	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs						
123-127 deg. M. P.........lb.	.02⅝	.02¾	.02⅝	.02¾	.02⅝	.03
128-132 deg. M. P.........lb.	.03⅛	.03¼	.03⅛	.03¼	.....	.03¼
133-137 deg. M. P.........lb.	.043	.04½	.043	.04½	.04	.04¾
Para Aldehyde, 110-55 gal drs.lb.	.20½	.23	.20½	.23	.20½	.23
Aminoacetanilid, 100 lb bg..lb.	.52	.60	.52	.60	.52	.60
Aminohydrochloride, 100 lb. kegs..........lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kegs...lb.	.78	.80	.78	.80	.78	.80
Chlorophenol, drums......lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drums..lb.	.....	.....	....	....	.....	.....
Cymene, refd, 110 gal dr..gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks..........lb.	.15½	.16	.15½	.16	.15½	.16
Nitroacetanilid, 300 lb bbls.lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls wks ....lb.	.48	.55	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs wks..........lb.	.23	.26	.23	.26	.23	.26
Nitro-orthotoluidine, 300 lb. bbls..........lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol 185 lb bbls....lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb. bbls..........lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls...lb.	.29	.31	.29	.31	.29	.31
Phenylenediamine, 350 lb bbls ....lb.	1.15	1.20	1.15	1.20	1.15	1.20
Toluenesulfonamide, 175 lb bbls..........lb.	.70	.75	.70	.75	.70	.75
Toluenesulfonchloride, 410 lb bbls wks..........lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls wk..lb.	.....	.58	....	.58	.42	.43
Paris Green, Arsenic Basis						
100 lb kegs..........lb.	.....	.24	....	.24	.24	.27
250 lb kegs..........lb.	.....	.23	....	.23	.23	.25
Persian Berry Ext., bbls.....lb.	.25	Nom	.25	Nom	.25	Nom.
Pentasol (see Alcohol, Amyl)...						
Pentasol Acetate (see Amyl Acetate)..........						
Petrolatum, Green, 300 lb bbl. lb.	.01⅞	.02	.01⅞	.02	.02	.02½
Petroleum Ethers, tanks 30-60°, Group 3..........gal.	.....	.10	....	.10	.....	.....
Petroleum solvents and diluents						
Cleaners' naphtha, Group 3, tanks..........gal.	.05¼	.06¼	.05¼	.06¾	.....	.....
Lacquer diluents, Bayonne tanks..........gal.	.12	.12¼	.12	.12¼	.....	.....
Group 3, tanks.......gal.	.06½	.07¼	.06½	.08	.....	.....
Petroleum thinner 47-49 deg. tanks..........gal.	.....	.08½	....	.08½	.....	.....
Rubber solvent, stand. grade tanks..........gal.	.05¼	.05½	.05¼	.06	.....	.....
Stoddard solvents 48-50 deg. tanks..........gal.	.04¾	.05	.04¾	.05¾	.....	.....
Phenol, 250-100 lb drums....lb.	.14½	.15	.14½	.15	.14½	.15
Phenyl-Alpha-Naphthylamine, 100 lb kegs..........lb.	.....	1.35	....	1.35	....	1.35
Phenylhydrazine Hydrochloride ....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phosphate						
Phosphate Acid (see Superphosphate)						
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis..ton	3.10	3.25	3.10	3.25	3.10	3.25
70% basis..........ton	3.75	3.90	3.75	3.90	3.75	3.90
72% basis..........ton	4.25	4.35	4.25	4.35	4.25	4.35
75-74% basis..........ton	5.25	5.50	5.25	5.50	5.25	5.50
75% basis..........ton	.....	5.75	....	5.75	.....	5.75
77-80% basis..........ton	.....	6.25	....	6.25	.....	6.25
Tennessee, 72% basis.....ton	.....	5.00	....	5.00	.....	5.00
Phosphorous Oxychloride 175 lb cyl..........lb.	.18	.20	.18	.20	.18	.20
Red, 110 lb cases.......lb.	.40	.45	.40	.45	.40	.46
Yellow, 110 lb cases wks.lb.	.27½	.32	.27½	.32	.27½	.37½
Sesquisulfide, 100 lb cs.....lb.	.38	.44	.38	.44	.38	.44
Trichloride, cylinders......lb.	.18	.20	.18	.20	.18	.20
Phthalic Anhydride, 100 lb bbls wks..........lb.	.15	.16	.15	.16	.15	.16
Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	37.00	45.00	37.00	45.00
Pine Oil, 55 gal drums or bbls						
Destructive dist..........lb.	.59	.62	.59	.62	.59	.63
Prime bbls..........bbl.	8.00	10.60	8.00	10.60	8.00	10.60
Steam dist. bbls..........gal.	.52	.54	.52	.54	.54	.61
Pitch Hardwood wks..........ton	.....	25.80	....	25.80	20.00	35.00
Plaster Paris, tech, 250 lb bbls ....bbl.	3.30	3.50	3.30	3.50	3.30	3.50
Platinum, Refined..........oz.	24.00	26.00	24.00	26.00	32.00	38.00
Pontol, tanks..........per gal.	.....	.54	....	.54	.54	.54

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Potash, Caustic, wks, solid...lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake...lb.	.0705	.08	.0705	.08	.0705	.08
Potash Salts, Rough Kainit 12.4% basis bulk...ton	.....	9.20	....	9.20	.....	9.20
14% basis...ton	.....	9.70	....	9.70	.....	9.70
Manure Salts... 20% basis bulk...ton	.....	12.00	....	12.00	12.00	12.65
30% basis bulk...ton	.....	19.15	....	19.15	.....	19.15
Potassium Acetate...lb.	.27	.28	.27	.28	.27	.28
Potassium Muriate, 80% basis bags...ton	.....	37.15	....	37.15	.....	37.15
Pot. & Mag. Sulfate, 48% basis bags...ton	.....	27.80	....	27.80	.....	27.80
Potassium Sulfate, 90% basis bags...ton	....	47.50	....	47.50	47.50	48.25
Potassium Bicarbonate, USP, 320 lb bbls...lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb casks...lb.	.07¼	.08	.07¼	.08	.07	.08½
Binoxalate, 300 lb bbls...lb.	.14	.17	.14	.17	.14	.17
Bisulfate, 100 lb kegs...lb.	.16	.30	.16	.30	.16	.30
Carbonate, 80-85% calc. 800 lb casks...lb.	.04⅞	.05	.04⅞	.05	.0475	.05
Chlorate crystals, powder 112 lb keg wks...lb.	.08	.08½	.08	.08½	.08	.08½
Chloride, crys bbls...lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kegs...lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb. cases...lb.	.50	.57½	.50	.57½	.50	.57½
Metabisulfite, 300 lb. bbl...lb.	.10½	.11	.10½	.11	.10½	.13
Oxalate, bbls...lb.	.16	.24	.16	.24	.16	.24
Perchlorate, casks wks...lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys 500 & 100 lb drs wks...lb.	.16	.16½	.16	.16½	.16	.16½
Prussiate, red, 112 lb keg...lb.	.36	.36½	.36	.38½	.....	.38½
Yellow, 500 lb casks...lb.	.16½	.17	.16½	.17	.16½	.21
Tartrate Neut, 100 lb keg...lb.	.....	.21	....	.21	.....	.21
Titanium Oxalate, 200 lb bbls...lb.	.21	.23	.21	.23	.21	.23
Propane, group 3, tanks...		.07	....	.07	.....	.....
Propyl Furoate, 1 lb tins...lb.	.....	5.00	....	5.00	.....	5.00
Pumice Stone, lump bags...lb.	.04	.05	.04	.05	.04	.05
250 lb bbls...lb.	.04½	.06	.04½	.06	.04½	.06
Powdered, 350 lb bags...lb.	.02½	.03	.02½	.03	.02½	.03
Putty, commercial, tubs...100 lb.	2.00	2.25	2.00	2.25	2.00	2.45
Linseed Oil, kegs...100 lb.	3.40	3.50	3.40	3.50	3.40	4.75
Pyridine, 50 gal drums...gal.	.85	.95	.85	.95	.85	1.25
Pyrites, Spanish cif Atlantic ports bulk...unit	.12	.13	.12	.13	.12	.13
Quebracho, 35% liquid tks...lb.	.02	.02¼	.02	.02¼	.02	.03
450 lb bbls c-1...lb.	.02½	.02¾	.02½	.02¾	.02½	.03¾
35% Bleaching, 450 lb bbl...lb.	.02	.02¼	.02	.02¼	.02	.04
Solid, 63%, 100 lb bales cif...lb.	.02⅜	.02½	.02⅜	.02½	.02	.02½
Clarified, 64%, bales...lb.	.02⅜	.03	.02⅜	.03	.02½	.03⅛
Quercitron, 51 deg liquid 450 lb bbls...lb.	.05½	.06	.05½	.06	.05½	.06
Solid, 100 lb boxes...lb.	.09½	.13	.09½	.13	.09½	.13
Bark, Rough...ton	.....	14.00	....	14.00	.....	14.00
Ground...ton	34.00	35.00	34.00	35.00	34.00	35.00
R Salt, 250 lb bbls wks...lb.	.40	.44	.40	.44	.40	.44
Red Sanders Wood, grd bbls. lb.	.....	.18	....	.18	.....	.18
Resorcinol Tech, cans...lb.	.65	.70	.65	.70	.65	.70
Rosin Oil, 50 gal bbls, first run...gal.	.....	....	.42	.43	.41	.45
Second run...gal.	.40	.42	.46	.47	.45	.51

Rosin

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Rosins 600 lb bbls 280 lb...unit ex. yard N. Y.						
B...	....	3.15	2.75	3.15	2.95	3.65
D...	....	3.25	2.95	3.30	3.15	3.75
E...	....	3.70	3.55	3.90	3.37½	4.00
F...	....	3.90	3.85	4.30	3.40	4.15
G...	....	3.95	3.90	4.30	3.45	4.15
H...	....	4.00	4.00	4.30	3.45	4.20
I...	....	4.05	4.05	4.75	3.47½	4.25
K...	....	4.30	....	4.60	3.60	4.65
M...	....	4.35	4.35	4.85	4.20	5.25
N...	....	4.75	4.75	5.30	4.65	6.05
WG...	....	4.80	4.80	5.60	5.25	6.45
WW...	....	4.85	4.85	6.20	5.85	6.65
Rotten Stone, bags mines...ton	23.50	24.00	23.50	24.00	20.00	23.00
Lump, imported, bbls...lb.	.05	.07	.05	.07	.05	.07
Selected bbls...lb.	.09	.12	.09	.12	.09	.12
Powdered, bbls...lb.	.02	.05	.02	.05	.02	.05
Sago Flour, 150 lb bags...lb.	.02½	.03	.02½	.03	.02½	.04
Sal Soda, bbls wks...100 lb.	.90	1.00	.90	1.00	.90	1.00
Salt Cake, 94-96% c-1 wks...ton	13.00	14.00	13.00	14.00	13.00	15.50
Chrome...ton	12.00	13.00	12.00	13.00	12.00	14.50
Saltpetre, double refd granular 450-500 lb bbls...lb.	.05¾	.06	.05¾	.06¾	.06	.06¾
Satin, White, 500 lb bbls...lb.	.....	.01½	....	.01½	.....	.01½
Shellac Bone dry bbls...lb.	.18	.19	.18	.19	.16	.26
Garnet, bags...lb.	.15	.16	.15	.16	.15	.20
Superfine, bags...lb.	.10	.10½	.09½	.10½	.10	.14
T. N. bags...lb.	.09	.09¼	.08½	.09½	.09	.13
Schaeffer's Salt kegs...lb.	.48	.50	.48	.50	.48	.50
Silica, Crude, bulk mines...ton	8.00	11.00	8.00	11.00	8.00	11.00
Refined, floated bags...ton	22.00	30.00	22.00	30.00	22.00	30.00
Air floated bags...ton	.....	32.00	....	32.00	.....	32.00
Extra floated bags...ton	30.00	35.00	30.00	35.00	30.00	40.00
Soapstone, Powdered, bags f.o.b. mines...ton	15.00	22.00	15.00	22.00	15.00	22.00

Soda

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Soda Ash, 58% dense, bags c-1 wks...100 lb.	.....	1.17½	....	1.17½	1.17½	.....
58% light, bags...100 lb.	.....	1.20	....	1.20	1.15	1.20
Contract, bags c-1 wks...100 lb.	.....	1.20	....	1.20	1.15	1.20
Soda Caustic, 76% grnd & flake drums...100 lb.	2.95	3.00	2.95	3.00	2.90	3.00
76% solid drs...100 lb.	.....	2.55	....	2.55	2.50	2.55
Sodium Abietate, drs...lb.	.....	.03	....	.03	.....	.03
Acetate, tech 450 lb. bbls wks lb.	.04½	.05	.04½	.05	.04½	.05
Alignate, drs...lb.	.....	.50	....	.50	.....	.50
Arsenate, drums...lb.	.07¾	.08¾	.07¾	.08¾	.....	.....
Arsenite, drums...gal.	.50	.75	.05	.75	.50	.75
Bicarb, 400 lb bbl...100 lb.	.....	2.25	....	2.25	.....	2.25
Bichromate, 500 lb cks wks lb.	.044	.04¾	.044	.04¾	.044	.05¼
Bisulfite, 500 lb bbl wks...lb.	.02¾	.03	.02¾	.03	.03	.04
Chlorate, wks...lb.	.05¾	.07¾	.05¾	.07¾	.05¾	.07¾
Chloride, technical...ton	12.00	13.00	12.00	13.00	12.00	13.00
Cyanide, 96-98%, 100 & 250 lb drums wks...lb.	.15½	.16	.15½	.16	.15½	.17
Fluoride, 300 lb bbls wks...lb.	.07	.07½	.07	.07½	.07	.07½
Hydrosulfite, 200 lb bbls f.o.b. wks...lb.	.20	.21	.20	.21	.21	.24
Hypochloride solution, 100 lb. cbys...lb.	.....	.05	....	.05	.....	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks...100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Technical, regular crystals 375 lb bbls wks...100 lb.	2.40	2.65	2.40	2.65	2.40	2.65
Metanilate, 150 lb bbls...lb.	.44	.45	.44	.45	.44	.45
Metasilicate, c-1, wks...100 lb.	2.85	3.25	2.85	3.25	2.85	4.00
Monohydrate, bbls...lb.	.....	.02½	....	.02½	.....	.02½
Naphthionate, 300 lb bbl...lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb. bags c-1 NY...100 lb.	.....	1.26	....	1.26	1.185	1.73½
Nitrite, 500 lb bbls spot...lb.	.07½	.08	.07½	.08	.07½	.08
Orthochlorotoluene, sulfonate, 175 lb bbls wks...lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls...lb.	.17	.19	.17	.19	.17	.20
Phosphate, di-sodium, tech. 310 lb bbls...100 lb.	2.00	2.10	2.00	2.10	2.00	2.75
tri-sodium, tech, 325 lb bbls...100 lb.	2.15	2.50	2.15	2.50	2.15	3.20
Picramate, 160 lb kegs...lb.	.69	.72	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bbl wks...lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, 100 lb keg...lb.	.15	.20	.15	.20	.15	.20
Silicate, 60 deg 55 gal drs, wks...100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40 deg 55 gal drs, wks...100 lb.	.....	.75	....	.75	.....	.75
Silicofluoride, 450 lb bbls NY...lb.	.04½	.05½	.04½	.05½	.05¼	.06¾
Stannate, 100 lb drums...lb.	.....	.19	.18	.19	.17	.19
Stearate, bbls...lb.	.20	.25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls...lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-1 wks...lb.	.02	.02¾	.02	.02¾	.02	.02¾
Sulfide, 80% crystals, 440 lb bbls wks...lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
62% solid, 650 lb drums 1c-1 wks...lb.	.03	.03¼	.03	.03¼	.03	.03¼
Sulfite, crystals, 400 lb bbls wks...lb.	.03	.03¼	.03	.03¼	.03	.03¼
Sulfocyanide, bbls...lb.	.28	.35	.28	.35	.28	.35
Tungstate, tech, crystals, kegs...lb.	.57	.67	.57	.67	.60	.88
Spermaceti, blocks, cases...lb.	.18	.19	.18	.19	.....	.....
Cakes, cases...lb.	.19	.20	.19	.20	.....	.....
Spruce Extract, ord., tanks...lb.	.....	.00⅞	....	.00⅞	.00⅞	.01
Ordinary, bbls...lb.	.....	.01¼	....	.01¼	.01¼	.01⅜
Super spruce ext., tanks...lb.	.....	.01¼	....	.01¼	.01¼	.01⅜
Super spruce ext., bbls...lb.	.....	.01⅜	....	.01⅜	.01⅜	.01½
Super spruce ext. powd., bags...lb.	.....	.04	....	.04	.04	.04½
Starch, powd, 140 lb bags...100 lb.	.....	2.29	....	2.29	2.29	2.67
Pearl, 140 lb bags...100 lb.	.....	2.19	....	2.19	2.19	2.84
Potato, 200 lb bags...lb.	.03¾	.04	.03¾	.04	.03¾	.06
Imported bags...lb.	.04¾	.05	.04¾	.05	.04	.06¼
Soluble...lb.	.08	.08½	.08	.08½	.08	.08½
Rice, 200 lb bbls...lb.	.07½	.08½	.07½	.08½	.07½	.10
Wheat, thick bags...lb.	.06	.06½	.06	.06½	.06	.07
Thin bags...lb.	.09½	.10	.09½	.10	.09½	.10
Strontium carbonate, 600 lb bbls wks...lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls NY...lb.	.07	.07½	.07	.07½	.07	.07¼
Peroxide, 100 lb drs...lb.	.....	1.25	....	1.25	.....	1.25
Sulfur Brimstone, broken rock, 250 lb bag c-1...100 lb.	.....	2.05	....	2.05	.....	2.05
Crude, f. o. b. mines...ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour for dusting 99½%, 100 lb bags c-1 NY...100 lb.	.....	2.40	....	2.40	.....	2.40
Heavy bags c-1...100 lb.	.....	2.50	....	2.50	.....	2.50
Flowers, 100%, 155 lb bbls c-1 NY...100 lb.	.....	3.45	....	3.45	.....	3.45
Roll, bbls 1c-1 NY...100 lb.	2.65	2.85	2.65	2.85	2.65	2.85
Sulfur Chloride, red, 700 lb drs wks...lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs wks...lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl...lb.	.07	.07½	.07	.07½	.07	.07½
Extra, dry, 100 lb cyl...lb.	.10	.12	.10	.12	.10	.12
Sulfuryl Chloride...lb.	.15	.40	.15	.40	.15	.40

Prices Current

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Talc, Crude, 100 lb bgs NY..ton	12.00	15.00	12.00	15.00	12.00	15.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bags NY....ton	18.00	22.00	18.00	22.00	18.00	22.00
Refined, white, bags....ton	35.00	40.00	35.00	40.00	35.00	40.00
Italian, 220 lb bags NY...ton	48.50	50.00	48.50	50.00	40.00	50.00
Refined, white bags.....ton	50.00	55.00	50.00	55.00	50.00	55.00
Superphosphate, 16% bulk, wks.....ton	6.75	7.00	6.50	7.00	7.00	8.00
Run of pile.....ton	6.25	6.50	6.00	6.50	.....	.....
Tankage Ground NY.....unit		1.75*	1.70	1.75*	1.30	1.50
High grade f.o.b. Chicago.unit		1.50	1.40	1.50	1.00	1.80
South American cif.....unit		1.85	....	1.85	1.80	2.25
Tapioca Flour, high grade bgs.lb	.03½	.05	.03½	.05	.03½	.05
Medium grade, bags.....lb.	.03	.04	.03	.04	.03	04
Tar Acid Oil, 15%, drums...gal.	.21	.22	.21	.22	.21	.22
25% drums.....gal.	.23	.24	.23	.24	.23	.24
Terra Alba Amer. No. 1, bgs or bbls mills.....100 lb.	1.15	1.75	1.15	1.75	1.15	1.75
No. 2 bags or bbls...100 lb.	1.00	1.25	1.00	1.25	1.50	2.00
Imported bags.....lb.	.01⅛	.01¼	.01⅛	.01¼	.01⅛	.01¼
Tetrachlorethane, 50 gal dr...lb.	.08½	.09	.08½	.09	.08	.09½
Tetralene, 50 gal drs wks.....lb.	.12	.13	.12	.13	.12	.20
Thiocarbanilid, 170 lb bbl....lb.	.25	.28½	.25	.28½	.25	.28½
Tin.....						
Crystals, 500 lb bbls wks...lb.		.25	.24	.25½	.22	.25
Metal Straits NY.....lb.		.24½	.23	.24½	.211	.24½
Oxide, 300 lb bbls wks.....lb.		.27½	....	.27½	.23	.26½
Tetrachloride, 100 lb drs wks .....lb.		.1344	.126	.1457	.1420	.1457
Titanium Dioxide 300 lb bbl...lb.	.17¼	.19¼	.17¼	.19¼	.17¼	.21
Calcium Pigment, bbls.....lb.	.06¼	.06½	.06¼	.06½	.06¼	.07¾
Toluene, 110 gal drs.....gal.		.35	....	.35	.....	.35
8000 gal tank cars wks....gal.		.30	....	.30	.....	.30
Toluidine, 350 lb bbls.....lb.	.88	.89	.88	.89	.88	.89
Mixed, 900 lb drs wks.....lb.	.27	.28	.27	.28	.27	.32
Toner Lithol, red, bbls.....lb.	.90	.95	.90	.95	.90	.95
Para, red, bbls.....lb.		.80	....	.80	.....	.80
Toluidine.....lb.	1.50	1.55	1.50	1.55	1.50	1.55
Triacetin, 50 gal drs wks.....lb.	.32	.36	.32	.36	.32	.36
Trichlorethylene, 50 gal dr...lb.	.09½	.10	.09½	.10	.10	.10½
Triethanolamine, 50 gal drs...lb.	.35	.38	.35	.38	.35	.42
Tricresyl Phosphate, drs.....lb.	.21	.26	.21	.26	.21	.26
Triphenyl guanidine.....lb.	.58	.60	.58	.60	.58	.60
Phosphate, drums.....lb.	.37	.39	.37	.39	.50	.65
Tripoli, 500 lb bbls.....100 lb.	.75	2.00	.75	2.00	.75	2.00
Tungsten, Wolframite..per unit	10.00	11.00	10.00	11.00	10.00	11.75

*&10

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Turpentine carlots, bbls.....gal.		.46¼	....	.50	.39	.47¾
Wood Steam dist, bbls....gal.		.42	.42	.46	.42	.46
Urea, pure, 112 lb cases.....lb.	.15	.17	.15	.17	.15	.17
Fert. grade, bags c.i.f.....ton		82.60	....	82.60	.....	82.60
c. i. f. S. points.....ton		82.60	....	82.60	.....	82.60
Valonia Beard, 42%, tannin bags.....ton	28.00	29.00	28.00	29.00	28.50	34.00
Cups, 30-31% tannin.....ton		17.50	17.50	19.00	19.00	23.50
Mixture, bark, bags.....ton		22.00	....	22.00	22.00	26.00
Vermillion, English, kegs.....lb.	1.05	1.20	1.05	1.40	1.28	1.80
Vinyl Chloride, 16 lb cyl.....lb.		1.00	....	1.00	.....	1.00
Wattle Bark, bags.....ton		25.00	24.00	27.00	26.00	33.00
Extract 55%, double bags ex-dock.....lb.	.03	.03½	.03	.03½	.03	.06½
Whiting, 200 lb bags, c-1 wks .....100 lb.	.85	1.00	.85	1.00	.85	1.00
Alba, bags c-1 NY.....ton		13.00	....	13.00	.....	13.00
Gilders, bags c-1 NY...100 lb.		1.35	....	1.35	.....	1.35
Wood Flour, c-l.....bags	20.00	36.00	20.00	36.00	.....	.....
Xylene, 10 deg tanks wks...gal.	.27	.29	.27	.29	.....	.29
Commercial, tanks wks...gal.		.26	....	.26	.....	.26
Xylidine, crude.....lb.	.36	.37	.36	.37	.36	.37
Zinc Ammonium Chloride powd., 400 lb bbls.....lb.	.04¾	.05	.04¾	.05	.....	5.75
Carbonate Tech. bbls NY..lb.	.09½	.11	.09½	.11	.09½	.11
Chloride Fused, 600 lb drs wks.....lb.	.05	.05¾	.05	.05¾	.05	.06
Gran, 500 lb bbls wks.....lb.	.05⅜	.06	.05⅜	.06	.05⅜	.06
Soln 50%, tanks wks...100 lb.		3.00	....	3.00	2.25	3.00
Cyanide, 100 lb drums.....lb.	.38	.39	.38	.39	.38	.39
Dithiofuroate, 100 lb dr...lb.		1.00	....	1.00	.....	1.00
Dust, 500 lb bbls c-1 wks...lb.		.04¾	....	.04¾	.041	.0525
Metal, high grade slabs c-1 NY.....100 lb.		3.27	3.02	3.32	2.87	3.52
Oxide, American bags wk...lb.		.05¾	....	.05¾	.0485	.07
French, 300 lb bbls wks...lb.	.08⅜	.10	.08⅜	.10	.08⅜	.11⅜
Palmitate, bbls.....lb.	.17½	.18½	.17½	.18½	.....	.....
Perborate, 100 lb drs.....lb.		1.25	....	1.25	.....	1.25
Peroxide, 100 lb drs.....lb.		1.25	....	1.25	.....	1.25
Resinate, fused, dark, bbls.lb.	.05¾	.06½	.05¾	.06½	.....	.....
Stearate, 50 lb bbls.....lb.	.16	.17	.16	.17	.16	.22
Sulfate, 400 bbl wks.....lb.	.03	.03½	.03	.03½	.03	.03½
Sulfide, 500 lb bbls.....lb.	.12	.13	.12	.13	.12	.13½
Sulfocarbolate, 100 lb keg..lb.	.21	.22	.21	.22	.21	.24
Zirconium Oxide, Nat. kegs...lb.	.02½	.03	.02½	.03	.02½	.03
Pure kegs.....lb.	.45	.50	.45	.50	.45	.50
Semi-refined kegs.....lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Castor, No. 1, 400 lb bbls....lb.	.09	.09½	.09¼	.10	.09½	.10½
No. 3, 400 lb bbls.....lb.	.08½	.09	.08½	.09½	.08¾	.10½
Blown, 400 lb bbls.....lb.	.11¼	.11¾	.11¼	.11¾	.11¼	.12½
China Wood, bbls spot NY...lb.		.05	.04⅛	.05¼	.05¼	.07¾
Tanks, spot NY.....lb.	.04½	.04¾	.04¼	.05	.04½	.06⅞
Coast, tanks.....lb.	.04⅛	.04½	.04⅛	.04½	.04¼	.06½
Coconut, edible, bbls NY....lb.		.10¾	....	.10¾	.....	.10¾
Ceylon, 375 lb bbls NY....lb.	.04	.04½	.04	.04½	.04	.04¾
8000 gal tanks NY.....lb.	.03	.03¼	.03	.03¼	.02⅞	.03⅞
Cochin, 375 lb bbls NY....lb.	.04½	.04¾	.04½	.04¾	.04½	.06
TanksN Y.....lb.	.04	.04¼	.04	.04¼	.03½	.05
Manila, bbls NY.....lb.	.04	.04¼	.04	.04¼	.04	.05
Tanks NY.....lb.	.03⅛	.03½	.03⅛	.03½	.03¼	.04
Tanks, Pacific Coast.....lb.	.02¾	.02⅞	.02¾	.03	.02⅞	.03½
Cod, Newfoundland, 50 gal bbls .....gal.		.21	.19	.21	.21	.30
Cod Liver see Chemicals.......						
Copra, bags, N. Y.....lb.	.016	.0162	.016	.019	.0175	.0235
Corn, crude, bbls NY.....lb.		.05¼	....	.05¼	.04½	.09
Tanks, mills.....lb.	.03	.03⅛	.02⅞	.03⅛	.02¾	.04½
Refined, 375 lb bbls NY...lb.		.06¼	....	.06¼	.05½	.07
Tanks.....lb.	.05⅞	.06	.05⅞	.06	.05	.08¾
Cottonseed, crude, mill.....lb.	.02⅝	.03	.02⅝	.03	.02⅜	.04⅛
Degras, American, 50 gal bbls NY.....lb.	.02½	.03	.02½	.03	.02½	.04
English, brown, bbls NY...lb.	.02⅞	.03½	.02⅞	.03½	.02⅞	.04
Greases, Brown.....lb.	.02	.02⅛	.02	.02⅛	.01⅜	.02¾
Yellow.....lb.		.02⅜	.01¾	.02⅜	.01⅜	.03
White, choice bbls NY.....lb.	.02½	.02¾	.02½	.03¾	.02	.04½
Herring, Coast, Tanks.....gal.	.11	.12	.11	.12	.....	.....
Lard Oil, edible, prime.....lb.	.08½	.08⅞	.08½	.08⅞	.08¼	.10
Extra, bbls.....lb.	.07½	.07⅝	.07½	.07⅝	.05¾	.07¼
Extra No. 1, bbls.....lb.		.06⅝	.06	.06⅝	.05½	.07
Linseed, Raw, five bbl lots...lb.		.082	.08	.084	.061	.078
Bbls c-1 spot.....lb.		.074	.072	.076	.053	.07
Tanks.....lb.		.068	.066	.07	.047	.064
Menhaden Tanks, Baltimore.gal.		.10	.09	.10	.09½	.20
Extra, bleached, bbls NY..gal.	.36	.37	.36	.37	.36	.40
Light, pressed, bbls NY...gal.	.23	.27	.23	.27	.25	.34
Yellow, bleached, bbls NY.gal.	.30	.30½	.30	.30½	.30	.37
Neatsfoot, CT, 20° bbls NY...lb.		.12½	.11¾	.12½	.11¼	.13½
Extra, bbls NY.....lb.		.07	.06½	.07	.05¾	.07
Pure, bbls NY.....lb.		.08	.07¾	.08	.07¾	.09
Oleo, No. 1, bbls NY.....lb.		.06⅛	.05	.06⅛	.05⅜	.07
No. 2, bbls NY.....lb.		.05¼	.04¼	.05¼	.04⅜	.06
No. 3, bbls NY.....lb.		.06½	....	.06½	.....	.06¾
Olive, denatured, bbls NY...gal.	.50	.58	.47	.60	.51	.65
Edible, bbls NY.....gal.	1.30	1.50	1.30	1.50	1.25	2.00
Foots, bbls NY.....lb.	.04½	.04⅝	.04⅜	.04¾	.04¼	.05
Palm, Kernel Casks.....lb.		.04	....	.04	.035	.04⅜
Lagos, 1500 lb casks.....lb.	.02⅝	.03¼	.02⅝	.03¼	.03	.05
Niger, Casks.....lb.	.02⅞	.03	.024	.03	.03	.03½
Peanut, crude, bbls NY.....lb.		.04	.03⅛	.04	.02¾	.04½
Refined, bbls NY.....lb.		.08½	....	.08½	.08¼	.09
Perilla, bbls NY.....lb.	.05¼	.05½	.05	.05½	.03¾	.05¾
Tanks, Coast.....lb.	.03¾	.04	.03¾	.04	.03½	.05
Poppyseed, bbls NY.....gal.	1.60	1.70	1.60	1.70	1.60	1.75
Rapeseed, in bond, bbls NY.gal.		.33	.33	.34	.....	.....
denatured, drms, NY.....gal.	.34	.35	.34	.36	.....	.....
Red, Distilled, bbls.....lb.	.05⅞	.06	.05⅞	.06	.06⅛	.07
Tanks.....lb.	.05	.05¼	.05	.05¼	.05¼	.06
Salmon, Coast, 8000 gal tks. gal.	.11½	.12	.11	.12	.11	.19
Sardine, Pacific Coast tks...gal.	.09½	.10	.09½	.10	.09½	.17½
Sesame, edible, yellow, dos...lb.		.09½	....	.09½	.08½	.09½
White, dos.....lb.	.10	.11	.10	.11	.10	.11
Sod, bbls NY.....gal.		.40	....	.40	.....	.40
Soy Bean, crude.....						
Pacific Coast.....lb.	.032	.035	.032	.035	.02¾	.03½
Domestic tanks, f. o. b. mills, ...lb.	.03¼	.03½	.027	.03½	.03	.032
Crude, bbls NY.....lb.		.046	.04	.046	.03¾	.05
Tanks NY.....lb.		.03⅞	.03½	.03⅞	.03¼	.04½
Refined, bbls NY.....lb.		.05	.04½	.05	.04½	.06
Sperm, 38° CT, bleached, bbls NY.....gal.		.88	.68	.88	.68	.70
45° CT, bleached, bbls NY.gal.		.81	.63	.81	.63	.65
Stearic Acid, double pressed dist bags.....lb.	.07½	.08	.07½	.08	.07½	.09
Double pressed saponified bags .....lb.	.08	.08¼	.08	.08¼	.07	.08½
Triple, pressed dist bags..lb.	.10¼	.10¾	.10¼	.10¾	.10½	.11
Stearine, Oleo, bbls.....lb.		.04	.03½	.04	.03¾	.06
Tallow City, extra loose.....lb.	.02½	.02⅝	.02	.02⅝	.02¼	.03⅜
Edible, tierces.....lb.		.03¾	.03½	.03¾	.03⅜	.04¼
Tallow Oil, Bbls, c-1 NY...lb.	.05¾	.06	.05¾	.06	.05¾	.07½
Acidless, tanks NY.....lb.	.06	.06¾	.06	.06¾	.06	.09
Vegetable. Coast mats.....lb.	.06	Nom.	.06	Nom.	.06	Nom.
Turkey Red, single bbls.....lb.	.06¼	.07½	.06¼	.07½	.06¼	.09
Double, bbls.....lb.	.08	.09	.08	.09	.08	.11
Whale, bleached winter, bbls NY.....gal.		.74	....	.74	.....	.74
Extra, bleached, bbls NY..gal.	.59	.61	.51	.61	.51	.60
Nat. winter, bbls NY.....gal.	.63	.65	.45	.65	.45	.55